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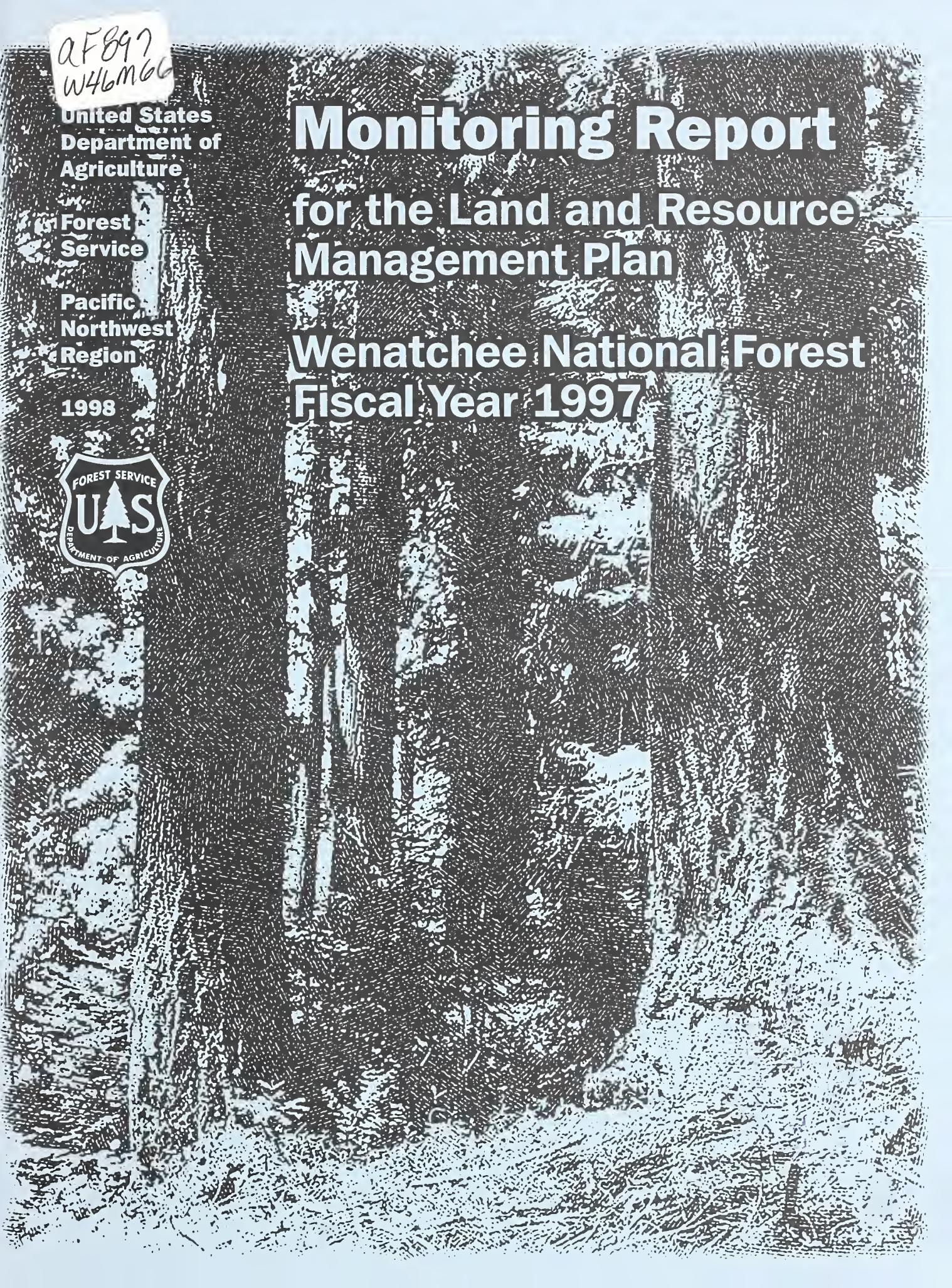
Pacific
Northwest
Region

1998



Monitoring Report for the Land and Resource Management Plan

Wenatchee National Forest Fiscal Year 1997



WENATCHEE NATIONAL FOREST

SUPERVISOR'S OFFICE

FOREST SUPERVISOR

Sonny J. O'Neal

215 Melody Lane
Wenatchee, WA
98801

(509) 662-4335

RESOURCE GROUP LEADER

Elton Thomas

PROTECTION, STATE AND PRIVATE FORESTRY GROUP LEADER

Susan L. Vap

ADMINISTRATIVE OFFICER

Mark Morris

PLANNING AND ENVIRONMENT GROUP LEADER

Glenn Hoffman

PUBLIC AFFAIRS GROUP LEADER

Paul Hart

ENGINEERING, LANDS AND MINERALS GROUP LEADER

Ted Swartz (acting)

RANGER DISTRICTS

CHELAN DISTRICT RANGER

Alphonse J. Murphy

428 W. Woodin Ave.
P.O. Box 189
Chelan, WA 98816

(509) 682-2576

CLE ELUM DISTRICT RANGER

Catherine Stephenson

803 W. 2nd Street
Cle Elum, WA 98922

(509) 674-4411

ENTIAT DISTRICT RANGER

Karin B. Whitehall

2108 Entiat Way
P.O. Box 476
Entiat, WA 98822

(509) 784-1511

LAKE WENATCHEE DISTRICT RANGER

Bob Sheehan

22976 State Hwy 207
Leavenworth, WA 98826

(509) 763-3103

LEAVENWORTH DISTRICT RANGER

Rebecca Heath

600 Sherbourne
Leavenworth, WA 98826

(509) 782-1413

NACHES DISTRICT RANGER

Jim Peña

10061 Highway 12
Naches, WA 98937

(509) 653-2205



U.S. Department of Agriculture • Forest Service • Wenatchee National Forest • 215 Melody Lane • Wenatchee, WA 98801 • 509 662-4335

March 30, 1998

Dear Forest User,

The Wenatchee Forest Plan establishes general direction of all resource management activities on the Forest. It provides for forest protection and coordinated multiple-use management of outdoor recreation, range, timber, watershed, wildlife and fish, minerals, and wilderness. The overall purpose is protection of ecosystem resources and providing for the sustained production of goods and services for the benefit of the American people.

Monitoring is a key part of Forest Plan implementation. This report summarizes and highlights Forest Service monitoring activities for Fiscal Year 1997 (October 1, 1996 through September 30, 1997). This is our eight Monitoring Report.

As Wenatchee National Forest Supervisor, I am responsible for ensuring that all Forest management activities comply with the Forest Plan Standards and Guidelines and Management Area Prescriptions. The monitoring and evaluation program tells us how we are doing in implementing the promises made in the Plan. To keep you informed, I have prepared this annual Monitoring Report which describes progress made in implementing the Forest Plan as reflected by monitoring and evaluation.

The Wenatchee Forest Plan has been amended 13 times since its implementation in 1990 through the end of September, 1997. These amendments have kept the Forest Plan current and responsive to the changing needs of the American people. The Plan was substantially amended by the Northwest Forest Plan on April 13, 1994. Whenever the 'Forest Plan' is used in this document it refers to the Wenatchee Forest Plan and all amendments.

If you have any questions, concerns, or comments regarding the information in this report, the addresses and phone number of our Ranger Districts and Supervisor's Office are located inside the cover of this document. I hope you will continue to be involved with the management of your Wenatchee National Forest.

Sincerely,

A handwritten signature in black ink that reads "Sonny J. O'Neal".

Sonny J. O'Neal
Forest Supervisor



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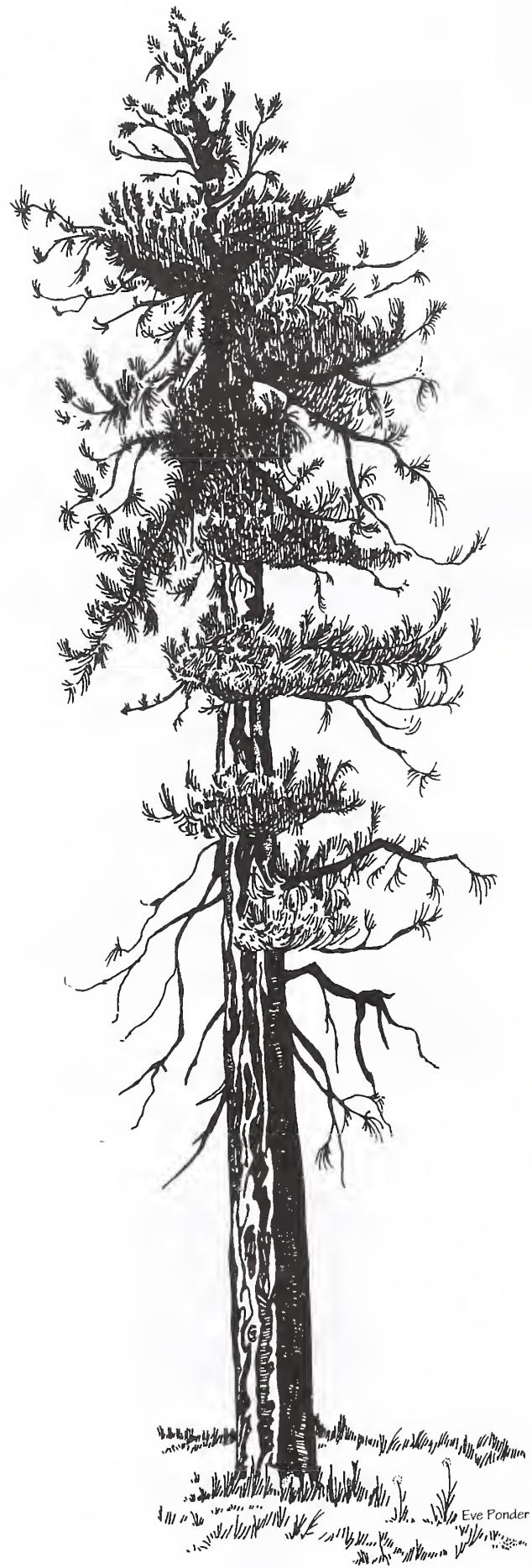
MONITORING REPORT

LAND AND RESOURCE MANAGEMENT PLAN

WENATCHEE
NATIONAL FOREST
WASHINGTON



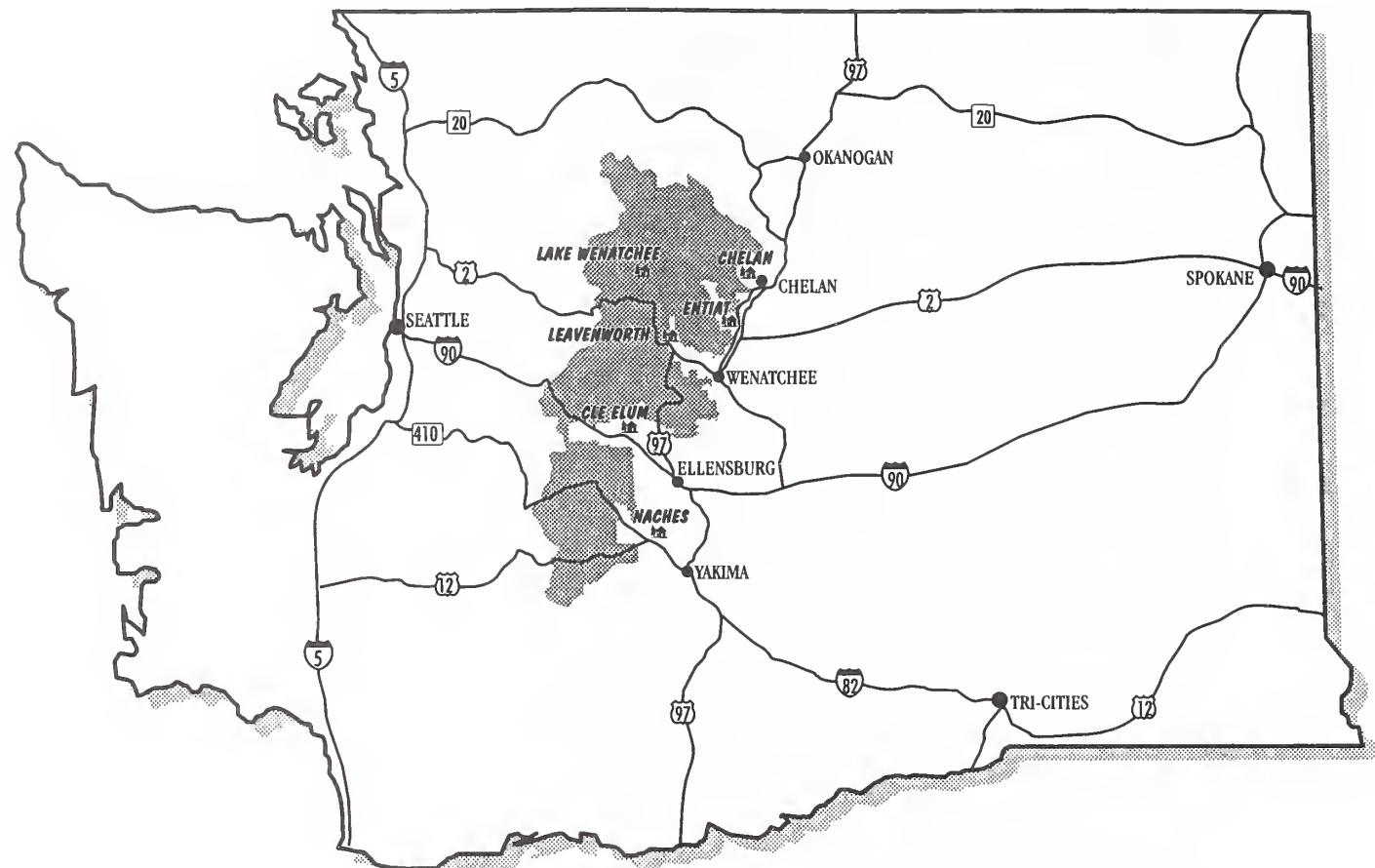
APRIL 1998



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WENATCHEE NATIONAL FOREST



W A S H I N G T O N

I. INTRODUCTION

PURPOSE OF THE MONITORING REPORT

The *Wenatchee Forest Plan* was implemented in 1990 after extensive analysis and public review and comment. The *Forest Plan* was amended in 1994 by the *Northwest Forest Plan*. Preparation of the Forest Plan is required by the National Forest Management Act of 1976. It provides standards, guidelines, land allocations, and philosophy which serve as the basis for all Forest Service management on the 2.2 million acre Wenatchee National Forest (Wenatchee NF).

The purpose of this annual report is to provide information to the Regional Forester, Forest Leadership Team, and the public on how well the *Forest Plan* objectives are being met. The monitoring and evaluation process will provide information to determine if:

- laws, regulations, and policies are being followed, including those found in the *Forest Plan* Management Area Prescriptions, and Forest-wide Standards and Guidelines, the Regional Guide, and Forest Service Handbooks.
- the management prescriptions are producing the predicted Goals and Objectives or Desired Future Conditions of the Forest environment.
- cost and annual budgets of implementing the *Forest Plan* are within projected limits.
- the projected range of outputs is being produced; it will also evaluate effects.

A number of monitoring systems are already in place to comply with administrative and legal responsibilities. *Forest Plan* monitoring does not replace these systems, but rather complements them by addressing specific issues and concerns identified through the planning process.

GENERAL INFORMATION

Monitoring consists of gathering data, making observations, and collecting and disclosing information. Monitoring is also the means to determine how well objectives of the *Forest Plan* are being met, and how appropriate the management Standards and Guidelines are for meeting the projected Forest outputs and protecting the environment. Monitoring is used to determine how well assumptions used in development of the *Forest Plan* reflect actual conditions.

Monitoring and evaluation may lead to changes in practices or provide a basis for adjustments, amendments, or *Forest Plan* revisions. Monitoring is intended to keep the *Forest Plan* dynamic and responsive to change and new information.

II. SUMMARY OF THE RECOMMENDED ACTIONS

The following categories of actions are used to summarize those monitoring items needing attention from the Forest Supervisor and Forest Leadership Team. Group Leaders responsible for each monitoring item have recommended actions based on their evaluations (please refer to *Individual Monitoring Items*).

Results are Acceptable/Continue to Monitor

The results for these monitoring questions are either acceptable (within the 'Threshold of Variability' listed in Chapter V of the *Forest Plan*), or more than 1 or 2 years of data is needed to evaluate the results (continue to monitor). For some items, several years of data collection is necessary to evaluate the effectiveness or validity of the *Forest Plan*. Studies are being initiated to provide the baseline data and inventories necessary to answer these questions.

Change Management Practices

The results for these monitoring questions exceed the 'Threshold of Variability' for a particular monitoring item question in Chapter IV. An evaluation of the situation indicates the need to change practices to comply with the *Forest Plan*.

Further Evaluation/Determine Action

The results for these monitoring questions may or may not exceed the 'Threshold of Variability'. Additional information is needed to better identify the cause of the concern and to determine future actions.

Propose Forest Plan Amendment

Areas where results are inconsistent with the *Forest Plan* objectives or the *Forest Plan* direction was not clear. The follow-up action requires either changing or clarifying the *Forest Plan* through the amendment process. Non-significant amendments can be made by the Forest Supervisor; significant amendments require Regional Forester approval.

The following table summarizes follow-up actions needed for each Monitoring Question.

Summary Table

Monitoring Item	Results OK	Change Management	Further Evaluation	Forest Plan Amendment
Recreation Opportunity Spectrum	■			
Trails	■			
Developed Recreation	■			
Management of Dispersed Recreation Areas	■			
Wild, Scenic, and Recreation Rivers	■			
Scenery Management	■			
Wilderness	■			
Cultural Resources (Heritage Resources)	■			
Coordination of Forest Programs with Indian Tribes	■			
Sensitive Plants, Biodiversity, and Old Growth	■			
Old Growth and Mature Habitat Indicators	■			
Mountain Goat Habitat	■			
Deer and Elk Habitat			■	
Primary Cavity Excavators			■	
Riparian For Wildlife Indicators			■	
Bald Eagle Habitat	■			
Peregrine Falcon	■			
Grizzly Bear	■			
Gray Wolf	■			
Marbled Murrelet	■			
Bighorn Sheep	■			
Townsend's Big-Eared Bat	■			
Canadian Lynx	■			
Ferruginous Hawk		■		
Common Loon	■			
Harlequin Duck	■			
Red-Legged Frog and Western Pond Turtle	■			
Fisher	■			
Hawk and Owl Nest Sites	■			
Snails	■			
Timber Offered	■			
Timber Harvest Units	■			
Timber Harvest	■			
Silvicultural Practices	■			
Reforestation	■			
Lands Not Suitable for Timber Management	■			
Maintenance of Long-Term Soil Productivity			■	
Fish/Riparian Standards and Guidelines			■	
Effectiveness of Riparian Standards and Guidelines			■	
Fish Management Indicator Species (MIS) Populations		■		
Aquatic Habitat Objectives			■	
Aquatic Ecosystems			■	
Range Management	■			
Road Management	■			
Insect and Disease	■			
Forest Fire Protection	■			
Use of Prescribed Fire	■			
Air Resource Management			■	
Mining Site Reclamation	■			
Mining Operating Plans	■			
Community Effects/Resource Budgets	■			
General Monitoring of Standards and Guidelines	■			

III. ACTIONS TAKEN ON 1996 RECOMMENDATIONS

This section briefly explains actions taken in Fiscal Year 1997 on last year's recommendations. For more detailed information on a specific activity please refer to *Individual Monitoring Items*.

Recreation

Recreation Opportunity Spectrum

No projects undertaken changed the allocated ROS classes identified in the *Forest Plan*.

Forest Trails

The Wenatchee NF received emergency flood money to restore some of the trail areas damaged by the winter storms. The Wenatchee NF participated in the Regional Trail Park Program to help generate funds for trail maintenance on the Wenatchee NF. Few conflicts between user groups were reported.

Management of Developed Recreation Facilities

The Wenatchee NF has initiated a review of developed recreation facilities and trails (INFRA and Meaningful Measures).

Management of Dispersed Recreation Areas

The Wenatchee NF has controlled vehicle access, provided toilets, and provided parking areas in several areas to minimize the impacts of recreation use on the riparian resource.

Wild, Scenic, And Recreational Rivers

There were no projects implemented on the Wenatchee NF in 1997 that had the potential to affect recommended river corridors.

Scenery Management

Scenery Resource Objectives

Last year's recommendations were implemented to maintain landscape character goals and scenic integrity along the three main viewsheds of Blewett Pass Highway 97, White Pass Highway 12, and Shady Pass. Scenic quality of these highways has been maintained, enhanced, or left alone.

Stand Character Goals

In 1997, 7,607 acres of vegetation were treated in the viewsheds. Most of the treated acres were partial cuttings and thinning to promote enhancement towards sustainable landscapes with large tree characteristics.

Wilderness

Use of areas within weekend overnight and day hike trips has increased significantly; and there are suggestions to change standards from social encounters to standards that measure the physical and biological impacts of recreation users.

Cultural

Cultural and Historical Site Protection

Heritage resource assistance was provided for 47 individual proposed projects in Fiscal Year 1997. A total of 13,265 acres were systematically inventoried, and 287 heritage resource sites located and documented. Fourteen separate historic properties were either enhanced (painting, landscaping), restored, or stabilized. Heritage resources were identified, documented and/or protected as a result of two Passport in Time (PIT) projects.

Cultural and Historical Site Rehabilitation

Agreements (Memorandums of Agreement, Memorandums of Understanding, and Programmatic Agreements) provided guidance for the enhancement and/or rehabilitation of 14 historic properties.

American Indians and Their Culture

The heritage program consulted with tribes on 53 individual projects ranging from large scale watershed improvements to smaller recreational developments.

Coordination and Communication of Forest Programs with Indian Tribes

Consultation with tribes that may have an interest in management activities is initiated at the earliest stage of project planning and is carried through to completion of the project. The Yakama Indian Nation continues to participate in Provincial Advisory Committee activities for both the Eastern Washington Cascades Province and the Yakima Province.

Sensitive Plants, Biodiversity, And Old Growth

Some monitoring activities used very formal plot techniques while some were much more informal and anecdotal in nature. All NEPA documents completed on the Wenatchee NF addressed sensitive plants where appropriate.

Five Watershed Analysis documents were completed in Fiscal Year 1997; these documents addressed biodiversity and/or the components including old growth (late-successional habitat), sensitive plants, and noxious weeds. Survey and Manage (S&M) species were also included in these analyses. There was both formal and anecdotal monitoring of weeds in 1997.

Wildlife

Old Growth and Mature Habitat Indicators

Few acres of spotted owl habitat were degraded or eliminated, 160 acres of habitat were restored, and 60 structures were completed (*1997 Wildlife, Fish, Rare Plant Report*).

Mountain Goat Habitat

The Wenatchee NF and Washington Department of Fish and Wildlife agreed to study why populations are decreasing in Chelan County and what actions are likely to reverse this trend.

Deer and Elk Habitat (Big Game Indicator Species)

The Wenatchee NF and Washington Department of Fish and Wildlife have agreed to develop a Memorandum of Understanding (MOU) for closer coordination between the agencies regarding elk management. Memorandums of Understanding on mule deer are being developed that would prioritize habitat improvements. The Wenatchee NF completed 338 acres of restoration, 90 structures and 1,682 acres of surveys for mule deer.

Bald Eagle Habitat

The 34 potential bald eagle nest areas and priority nest stands have been entered into geographic information systems (GIS) and are available for project assessments.

Peregrine Falcons

Additional helicopter cliff surveys were completed. New data on potential sites were entered into GIS and WILDOBS databases.

Gray Wolf

From 1996 to 1997 the information in the *Gray Wolf Observations* and *Gray Wolf Information* tables (*Individual Monitoring Items*) has been updated.

Marbled Murrelet

Fifty acres were surveyed in 1996 and 2,170 in 1997 for marbled murrelet; no new sightings were found on the Wenatchee NF.

Bighorn Sheep

Washington Department of Fish and Wildlife has completed a *Bighorn Sheep Plan* for Washington State. A Memorandum of Understanding with Washington State Department of Wildlife is in process and it will look at habitat and other resource conflicts.

Townsend's Big Eared Bat

The part of Boulder Cave thought to be a nursery area had gates installed to keep out human visitors. Some ANABAT (records bat sounds) work continued. Two structures were established and 250 acres of habitat restored to attract Big Eared Bats. One acre of inventory in Boulder cave was completed and about 60 bridges surveyed.

Canadian Lynx

Historic as well as new sightings are being located and entered into the WILDOBS database. A management guide for lynx was published in 1997. Inventories were completed on 9,500 acres. There were two structures for lynx completed.

California Wolverine

In 1997 12,000 acres were surveyed for wolverine, four structures were built, and 53 acres of wolverine habitat were restored. There was an airplane survey during the winter of 1997 that did not locate wolverine on the Wenatchee NF.

Harlequin Duck

In 1997, 340 acres of habitat were restored, four structures completed, and 200 acres surveyed for Harlequin ducks. Some maps have been developed of potential habitat.

Red-Legged Frog, Larch Mountain Salamander, and Western Pond Turtle

Maps have been developed to show distribution of some amphibian species. Additional information has been collected to determine the range of these species and their population and habitat trends in 1996 and 1997. Twenty-five acres were surveyed for Larch Mountain Salamanders, and they were located at two new sites.

Fisher

Fisher sightings have been entered in WILDOBS, and are available for use in trying to verify fisher existence in this area. In 1997, 266 acres were restored, 30 structures completed and 9,400 acres surveyed for fisher.

Goshawk

Most of the survey work on the Wenatchee NF is completed by Washington Department of Fish and Wildlife.

Hawk and Owl Nest Sites

The process of entering nest sites into WILDOBS continued. Great gray owl nest boxes were put up on some Ranger Districts (RD) to try and locate nesting gray owls on the Wenatchee NF. Great gray owl protocol surveys were completed on all Ranger Districts; no great gray owls nests were found.

Snails

Some inventory work was completed for these species.

Riparian for Wildlife

Some use surveys of waterfowl began, and information collected by Washington Department of Fish and Wildlife was gathered. There were 508 acres of improvements, 12 structures built, plus 220 acres of inventories completed.

Timber Offered, Harvested, and Related Silvicultural Activities

Timber Offered

Timber harvested, as reported in the Timber Sale Program Information Reporting System, Source and Application of Funds Worksheet was 56.4 MMBF (million board feet). Timber Commodity was 10.0 MMBF, Forest Stewardship was 42.6 MMBF, and Personal Use was 3.8 MMBF.

Timber Harvest Units

Almost all of the harvest acres (86.1 percent) were selection (sanitation/salvage) and most were from 1994 fire salvage or *Dry Site Strategy* thinning sales.

Timber Harvest

No acres were clearcut; the focus has been to harvest fire salvage (sanitation/ selective tree removal), and thinning from below on overstocked stands.

Silvicultural Practices

As a result of the *Dry Site Strategy* the Wenatchee NF is aiming prescriptions at reducing stocking levels so growth will be maintained on sites that already have maximum stand density index. The current silvicultural prescriptions are meeting the intent of the *Forest Plan* to insure that stands are growing at rates that are being estimated by yield models.

Reforestation

During Fiscal Year 1997, 16,226 acres were planted with tree seedlings, or were reforested naturally. Most of the acres were planted in stands that were burned. *Status of Reforestation After Final Harvest* shows that 3,665 acres out of 3,770 acres harvested were adequately stocked (97 percent).

Lands Not Suitable for Timber Management

There appear to be no problems with identifying acres that do not meet *Forest Plan* Standards and Guidelines. Any new changes are being updated in the GIS database.

Soil, Water, And Fisheries

Maintenance of Long-Term Soil Productivity

During the 1997 field season soil disturbance monitoring was conducted on five sale units pre and post harvest, but prior to soil rehabilitation treatments.

Fish/Riparian Standard and Guideline Implementation

Four projects (*Jobs in the Woods*) that received interdisciplinary review were rehabilitated. Other watershed restoration projects were monitored (see *Individual Monitoring Items*).

Effectiveness of Riparian Standards and Guidelines

Between 1989 and 1997, the Wenatchee NF has completed stream surveys on over 1,300 miles of stream. Four high lakes were sampled on the Wenatchee NF. Monitoring fine sediment levels in spawning gravels began with a few streams in 1990 and has increased to 84 sampled reaches. The Wenatchee NF has been monitoring stream temperatures since 1990.

Fish Management Indicator Species (MIS) Populations

The Wenatchee NF has not been actively monitoring anadromous fish returns due to established monitoring programs at mainstem Columbia River dams; Yakama Indian Nation spawning surveys in the Yakama River Basin; and Chelan County PUD spawning surveys in the Wenatchee and Entiat Rivers.

Aquatic Habitat Objectives

A Level I structure monitoring survey was conducted on three streams in the Wenatchee with a more informal survey on one other stream. A Level I survey simply determines the presence, movement, or loss of a structure. A total of 219 structures were identified, 71 percent (156 structures) were in place, 15 percent (33 structures) had shifted on site, and 14 percent (30 structures) had disappeared from the area.

Range Management

In 1997, the results of three environmental assessments were implemented on three grazing allotments. Grazing utilization monitoring was completed in 9 out of 22 active allotments.

Road Management

Approximately 0.3 miles of roads were reconstructed (and many spot repairs and improvements made) as part of the *Jobs in the Woods* program. The Timber Purchaser Road Construction was 5.8 miles. This year, 65 percent of the roads were not maintained to Standard.

Insect and Disease Control

A survey was conducted during the summer of 1997 by the Forest Insect and Disease (FID) staff of the Pacific Northwest Region, in cooperation with the Washington Department of Natural Resources.

Forest Fire Protection

Forest Fire Protection

The Wenatchee NF emphasized safety both in training and daily work activities. In addition to the fire suppression program, fire detection and prevention continued to be emphasize as important components of the Fire Management Program.

Use of Prescribed Fire

During Fiscal Year 1997, 3,852 acres were treated with prescribed fire.

Air Resource Management

The Wenatchee and Mt. Baker-Snoqualmie National Forests jointly sponsor an IMPROVE site to monitor visibility in Alpine Lakes Wilderness. Preliminary results from the site indicate some of the sources of visibility impairment. Important sources of visibility impairment include sulfates, nitrates, and organics.

Minerals

Mining Site Reclamation

Approximately 88 acres were disturbed by mining-related activities on the Wenatchee NF. Of this, about 35 acres (40 percent) were satisfactorily reclaimed and met reclamation objectives.

Mining Operating Plans

Approximately 113 Plans of Operations and Notices of Intent were processed in Fiscal Year 1997. Of these, only 56 percent of the total operations were monitored.

IV INDIVIDUAL MONITORING ITEMS

A. RECREATION

Monitoring Item-

RECREATION OPPORTUNITY SPECTRUM (ROS)

The goal is to provide a well balanced array of recreation opportunities across the breadth of the Recreation Opportunity Spectrum (ROS) to meet the public demand for outdoor recreation. The monitoring question is:

Are Forest Management activities resulting in changes in ROS settings; and, do end results meet the experience levels expected in the Forest Plan?

The major activity on the Wenatchee NF that had the potential to affect ROS settings was timber salvage. The *Dry Site Strategy* also had the potential to affect ROS settings with its emphasis on reducing the possibility of large, landscape fires using timber sales, prescribed fire, and vegetation treatments. A major emphasis in the layout and marking of these treatments was to restore the landscape to an ecologically sustainable forest. A major emphasis is the retention of larger trees while removing smaller trees that provide the ladder fuels that lead to large, uncontrollable wildfires. These projects did not change the allocated ROS classes identified in the *Forest Plan*.

Recommendations Include:

Continue monitoring as scheduled.

Monitoring Item-

FOREST TRAILS

The goal is to manage trail use to provide recreation opportunities in a wide range of recreation settings, and in harmony with other resource management objectives. The monitoring questions are:

Are trails providing the variety of opportunities intended in the Forest Plan?

Are trails with mixed users (e.g. horse/hiker, hiker/ ORV) meeting the expectations for all intended users?

In Fiscal Year 1997, trail maintenance funds continued to decrease, but at a slower rate than previous years. The Wenatchee NF trail budget remains at 60 percent of what it was just 3 years ago. The Forest Service in Oregon and Washington initiated a Trail Park Program, which created an annual pass and day use fees for trailhead parking at selected trailheads to raise money for trail maintenance. The winter of 1996-1997 was extremely severe with record snowfall amounts early in the season leading to flooding and windthrow across many trails. This was further compounded with several windstorms during the summer months.

Last year's Monitoring Report noted that 35 percent of the trail system was below *Forest Plan* Standards. The Wenatchee NF has just over 3,000 miles of bare ground trails. Almost all trails go through rugged, mountainous terrain which makes them difficult and expensive to maintain. The Wenatchee NF land area is 40 percent within classified Wildernesses. In wildernesses, the Forest Service uses 'primitive' tools, such as cross-cut saws, for maintenance in an effort to protect wilderness values; per Forest Service Policy, the use of mechanized and motorized equipment for maintenance and administrative purposes must be approved by the Forest Supervisor, and are generally only approved to protect wilderness resources and safety issues.

Due to the heavy damage caused by winter snows, trail maintenance costs within the wildernesses tripled and quadrupled, leading to fewer trails maintained last summer. On the Lake Wenatchee RD, cutting the windthrow trees on one trail cost \$3,000 per mile. The lack of funds for trail clearance lead to damaged riparian areas and wilderness resources, as users 'went around' down trees, causing erosion and soil compaction in these sensitive areas.

On the Lake Wenatchee and Leavenworth RDs, significant portions of the trail system remain blocked by down trees. Naches, Chelan, and Cle Elum RDs also had areas where down trees blocked trails. The Wenatchee NF applied for, and received, emergency flood money to restore some of the trail areas damaged by the winter storms, but the money was received late in the season. This money will be used to clear trails early in 1998. Two RDs, Leavenworth and Lake Wenatchee, are proposing (through an environmental assessment) to approve the use of chainsaws within wildernesses to prevent further damage to the wilderness resource and ensure that crews can clear trails safely.

The Wenatchee NF participated in the Regional Trail Park Program to help generate funds for trail maintenance on the Wenatchee NF. The fee is \$25 for an annual parking pass, or \$3 per day. The Wenatchee NF also offered a program where users could volunteer to do trail maintenance and earn a pass. The Wenatchee NF raised \$26,000 for trail maintenance under this program; the amount was disappointing, and due to several factors including: (1) a late start due to printing problems, and (2) only 30 to 40 percent of trail users bought permits (and most sales were in western Washington). The printing problems were resolved, and trail passes have been printed for the next 2 years. The Forest Service will enforce the pass requirement this year, which should significantly increase revenue. The Mt. Baker-Snoqualmie and Wenatchee National Forests will share trail park revenues generated by the program based on trail miles, trail maintenance costs, visitor use, and visitor preference. Visitor data show that 70 to 90 percent of the trail users on the Wenatchee NF come from the Puget Sound area. All the money received from this Program will go to trail related projects.

The Wenatchee NF has close to 1,000 miles of snowmobile trails which follow Forest roads, and about 100 miles of cross-country ski trails. The snow trail program is funded by the Forest Service, Washington State (through Sno-Park program), and volunteers. The Chelan RD is operating the Echo Ridge Ski Area for cross-country skiing under the Recreation Feed Demo Pilot.

The Washington State Interagency Committee for Outdoor Recreation provides significant funding for trail projects on the Wenatchee NF. Volunteers from organizations such as the Back Country Horseman, Washington Trail Association, and motorcycle and mountain bike groups help maintain trails throughout the Wenatchee NF. The Wenatchee NF's trail program is significantly improved through our partnership with other government agencies and volunteers.

The trails of the Wenatchee NF provide the variety of opportunities intended in the *Forest Plan*. Trails with mixed user groups are meeting the expectations for their intended users. Few conflicts between user groups were reported.

Recommendations Include:

Continue monitoring as scheduled.

Monitoring Item-**MANAGEMENT OF DEVELOPED RECREATION FACILITIES**

The goal is to provide safe, well maintained, developed recreation facilities for the public commensurate with recreation demand. The monitoring questions are:

Are available developed recreation facilities meeting public demand?

Are developed recreation sites, areas, and facilities being adequately maintained to serve the public and protect resource values?

Visitor use at developed recreation sites continues at high levels. The spring and early summer of 1997 had cold, rainy weather. This resulted in recreation use being slightly below those of previous years. This trend appears consistent with reports throughout the western United States. Most site were at, or close to, capacity on most summer weekends. The Wenatchee NF is currently meeting public demand for developed recreation facilities.

The Forest Service Capital Investment Program for new construction, or reconstruction of existing recreation facilities such as campgrounds and trails, continues to decline. The campground concessionaire program has reduced Forest Service maintenance costs. The Wenatchee NF has initiated a review of developed recreation facilities and trails (INFRA and Meaningful Measures); this should provide better information on the condition of recreation facilities and costs of bringing them up to current Standards.

Recommendations Include:

Continue monitoring as scheduled.

Monitoring Item-

MANAGEMENT OF DISPERSED RECREATION AREAS

The goal is to provide opportunities for dispersed recreation activities where compatible with other resource management objectives. The monitoring questions are:

Are dispersed sites meeting public demand?

Is the Recreation Opportunity Spectrum providing the expected variety for Forest users?

Dispersed recreation activities continue to be a high percentage of total recreation use on the Wenatchee NF. The highest demand is for camping spots adjacent to streams and lakes accessible by roads. The increase in both camping and trail use in riparian areas remains a concern. In several areas, the Wenatchee NF has controlled vehicle access, provided toilets, and provided parking to minimize the impacts of recreation use on the riparian resource.

Recommendations Include:

Continue monitoring as scheduled.

B. WILD, SCENIC, AND RECREATIONAL RIVERS

Monitoring Item-

WILD, SCENIC, AND RECREATIONAL RIVERS

The goal is to retain the character and attributes of rivers recommended for Wild, Scenic, or Recreational designation. The monitoring question is:

Are resource management activities along recommended river corridors being conducted in a manner to provide protection at the appropriate level of classification?

There were no projects implemented on the Wenatchee NF in 1997 that had the potential to affect the classification determined in the *Forest Plan* for recommended rivers.

Recommendations Include:

Continue monitoring as scheduled.

C. SCENERY MANAGEMENT

Monitoring Item -

SCENIC RESOURCE OBJECTIVES

The objective is to manage vegetation and facilities to provide views that are consistent with the stated scenic quality objectives for each management area. The monitoring question is:

Do the cumulative effects of all resource activities within a viewshed meet the desired scenic condition?

Wenatchee NF landscape architects reviewed projects on Ranger Districts to assess the potential cumulative effects of resource activities on scenery. Field review of project areas was done along three major viewsheds; Blewett Pass Highway 97, White Pass Highway 12, and Shady Pass viewsheds were selected for summary analysis. Scenic resource analyses on these viewsheds indicate that the viewsheds vary from natural appearing to an altered condition.

Blewett Pass viewshed is in a natural to slightly altered condition throughout most of the travel route, except for the altered condition between Blewett Pass and Bonanza Campground. A thinning project and natural fuels reduction project was done in Fiscal Year 1997 along the foreground adjacent to a meadow (north of U.S. Highway 97 next to the Old Blewett Road intersection Forest Road 2208). Reducing natural fuels in the pine forest and keeping meadow-like open spaces maintained the scenic variety along U.S. Highway 97. A thinning project south of Mineral Springs Restaurant was done to increase tree growth and enhance future scenic variety by promoting growth of larger trees along the roadside.

The Diamond Head electronic site project north of Blewett Pass (Swauk pass) was done to provide cellular communication along the north side of Swauk Pass U.S. Highway 97. A tower was constructed in the middleground view from U.S. Highway 97; the tower was done in a manner to blend with the scenic landscape character of the area where form, line, color and textural patterns were blended with the landscape. The result was high scenic integrity as viewed from U.S. Highway 97. A watershed restoration project along Scotty Creek was done to improve the riparian zones, harden dispersed recreation sites and resurface the gravel road (for safety). The result is an integration of people with natural resource values and improvement of the scenic settings for the area.

White Pass viewshed is in a natural to slightly altered condition throughout the travel route. Vegetation changes throughout the travel route blend well with the natural diversity of landscapes from the Wenatchee NF boundary to White Pass. The scenic qualities of this viewshed are maintained at a very high level. A natural fuels reduction project was completed north of U.S. Highway 12, adjacent to the White Pass Work Center. Thinning and reducing fuels for forest health and fuels hazard reduction enhanced the scenic quality by exposing the large Ponderosa pine

trees as viewed from U.S. Highway 12. Maintaining and sustaining large trees along the Highway provides scenic variety along the travel route. Future thinning plans will enhance large tree characteristics along the viewshed for scenic viewing, forest health, and meeting other resource objectives. Ski facilities have improved signing along the White pass area to reduce clutter.

Shady Pass viewshed is in a slightly altered to altered condition. The area is recovering from past management practices. The 1994 catastrophic fire and its associated fire lines (that created a long linear opening along the ridge top) still exist. The existing vegetation is slowly recovering in the area. Some thinning was done for fuels reduction along the foreground. Viewing into thinned stands, and the long-term benefit of future large tree characteristics, are benefits for scenic quality. There were no major projects implemented along this viewshed this year. Future plans are to improve forest health, reduce hazard fuels and promote large tree characteristics on the lower end, from Grouse mountain towards Lake Chelan. The scenery goals are to maintain and enhance large tree characteristics and provide a natural appearing landscape along the travel route.

Scenic areas of the 1994 fire restoration projects

The Fiscal Year 1995 Monitoring Report suggested monitoring high scenic areas of the 1994 fire restoration projects to evaluate the scenic integrity (condition) and the landscape character changes from the existing condition to project implementation. The Tumwater, Boundary Butte, and 8 Mile fire restoration projects (as viewed from the town of Leavenworth and surrounding areas) were sample monitored this year. All three projects met the landscape character goals of maintaining the mosaic pattern of varying snag and vegetation densities throughout the foreground views, middleground views and irregular skyline patterns. The scenic integrity (condition) met a High scenic quality standard. Natural patterns were used in the design to create an harmonious integration from the existing to the mosaic patterns of the adjacent landscape. The blending of the existing landscape to the treated area appears intact.

One area that has increased visibility from the fire restoration project is the Mountain Home Road. This road was slightly visible, but screened mostly by the existing green forested vegetation before the fire in 1994. Balancing the removal of a variety of snags along the roadside for safety eliminated some of the screening. The scenic quality of the area remains high. Mosaic greening along the forest floor are showing through the mosaic of snag densities throughout the burned area as the forest is being renewed. The design arts were integrated with the sciences to blend snag densities, and mosaic patterns of green vegetation with the landforms to create a more sustainable natural appearing landscape.

Recommendations Include:**Blewett Pass Highway 97 Viewshed**

To maintain scenic values, additional vegetative changes along the roadside from the top of Blewett Pass to Bonanza

Campground should be kept to a minimum adjacent to areas of past vegetative treatments, except to ensure public safety in campgrounds and adjacent to Highway 97.

Continue working with the Department of Transportation and permittees to minimize signs and structures, and for roadside improvements.

White Pass Viewshed

Continue working with White Pass Ski Company to improve signs, landscaping and color scheme.

Continue monitoring Highway 12 to maintain the highest possible scenic quality by designing all activities to retain naturally appearing scenery.

Continue working with Washington State Department of Transportation toward functional and aesthetically pleasing structures, safety, and danger tree removal.

Vegetation changes and structures along the Highway 12 viewshed should continue to be monitored and enhanced to protect and improve scenic qualities.

Shady Pass Viewshed

Maintain and enhance scenic quality while reducing fuels and improving forest health throughout the viewshed.

Incorporate design arts into thinning projects to improve scenic quality.

Future vegetation management along the viewshed should be designed to meet moderate to high scenic objectives. Varying stand densities, irregular spacing, clumping, and creating a variety of spaces (with contrasting variety and diversity of tree sizes) will enhance scenic quality.

Scenic Areas of the 1994 Fire Restoration Projects

Continue to monitor as scheduled.

Monitoring Item -

STAND CHARACTER GOALS

The objective is to manage vegetation so that the stand character (species and structural mix) is moving in the direction specified for each Visual Quality Objective (VQO). The monitoring question is:

Are related Standards and Guidelines being implemented, and do they achieve stated goals and objectives, particularly scenic character goals?

The desired future condition for scenery is a multi-story stand composition, variety and diversity of large trees in groves, clumps, and/or scattered throughout the landscape. The high degree of naturalness is desirable.

More recently, fire restoration and a few thinning projects to reduce fuels and promote healthy ecosystems have been initiated. This helps achieve a long-term forested environment with a more natural appearing landscape with scattered groups, individual large trees, and varying densities of vegetation patterns and a more open stand. The trend of harvest practices in the last 7 years has been towards fewer openings (clearcutting) and heavily oriented towards partial cutting and thinning, where trees are left to achieve scenic quality and other resource goals.

Another goal is to reduce the amount of contrast in the viewsheds. The trend is viewsheds recovering to more naturally appearing landscapes. In 1997, 7,607 acres of vegetation were treated (see monitoring item- *Silvicultural Practices*). Most of the treated acres were partial cuttings and thinning to promote enhancement towards sustainable landscapes with large tree characteristics. An example of specific scenic goals to maintain and perpetuate large yellow bark ponderosa pines was monitored along the White Pass Highway 12 on the natural fuels reduction project adjacent to White Pass Work Center. Thinning and reducing natural fuel loading enhanced the appearance and long-term health of the existing large yellow bark Ponderosa pine trees.

Recommendations Include:

Continue monitoring as scheduled.

D. WILDERNESS

Monitoring Item-

RECREATION IMPACTS ON WILDERNESS RESOURCES

The goal is to perpetuate wilderness character, natural ecological processes, and provide recreation opportunities appropriate in wilderness. The monitoring question is:

Is recreation visitor use or management resulting in changes in the physical, biological, or social settings that approach Limits of Acceptable Change (LAC) Standards specified in the Forest Plan?

The wilderness budget on the Wenatchee NF continues its dramatic decline. For Fiscal Year 1997, the wilderness budget declined 16 percent from Fiscal Year 1996. The decline has continued in Fiscal Year 1998, declining another 16 percent. Almost half of the trails on the Wenatchee NF are within wilderness areas; the Trail Park Program will provide a source of funds for wilderness trails. This will allow more money to be spent on protecting wilderness resources.

The *Forest Plan* identified that the supply of wilderness recreation opportunities significantly exceeded that of demand for wilderness recreation (*Forest Plan*, page II-13). For most of the Wildernesses there are no problems with Limits of Acceptable Change Standards that are specified in the *Forest Plan*. Reports from wilderness rangers indicates that back-country use beyond the weekend overnight pack trip has declined over the past decade. Use of areas within weekend overnight and day hike trips has increased significantly. It is in these areas where the Limits of Acceptable Change Standards might be exceeded. There are significant problems with measuring encounters and applying the LAC Standards. There have been suggestions to change standards from social encounters to standards that measure physical and biological impacts of recreation users.

Recommendations Include:

Continue monitoring as scheduled.

Continue to work on application of Limits of Acceptable Change Standards for wilderness management.

E. CULTURAL RESOURCES (HERITAGE RESOURCES)

Monitoring Item -

CULTURAL AND HISTORICAL SITE PROTECTION

The goal is to protect cultural and historical resources from vandalism, disturbance from project activities, and natural degradation. The monitoring questions are:

Are the National Register characteristics of unevaluated and significant cultural resource properties being protected?

Are all reasonably locatable cultural resources being discovered during project area reconnaissance?

Heritage resource assistance was provided for 47 individual proposed projects in Fiscal Year 1997. Of those, 29 projects required Section 106 consultation with the Washington State Historic Preservation Office (SHPO). Eighteen projects required either on-site monitoring or inspection during implementation. A total of 13,265 acres were systematically inventoried, and 287 heritage resource sites located and documented. This brings the Wenatchee NF's total number of historic properties to 1,132. Of the 287 new sites documented, 34 were formally evaluated per National Register criteria; of those, 30 were determined not eligible and four were determined eligible. The eligibility of the remaining 253 sites has yet to be determined. No new sites were added to the National Register of Historic Places.

Large project areas inventoried included Mad Hornet, Pendleton, and Nile Timber Sale planning areas; planning areas ranged in size from 4,600 to over 8,000 acres. Other large surveys were conducted for two large trail projects (Conrad Meadow and the Upper Entiat Trail) and two fire recovery projects (Fruend and Tyi-Chi). The latter were addendum surveys related to fire recovery efforts from the 1994 fire season. The remainder of the projects were smaller scale recreation, summer home (recreational residence), watershed restoration/stabilization, trail, salvage sale, permit re-licensing, road, and facilities-related projects. Three project areas were inventoried by private contractors on behalf of special use permittees. All heritage resources documented as a result of these undertakings were avoided and four separate monitoring reports completed.

The Engineering and Facilities Staff routinely consults with the heritage staff concerning the maintenance of Forest Service administrative sites, campground and trail shelters, and lookouts eligible for, or listed on, the National Register of Historic Places. In Fiscal Year 1997, 14 separate historic properties were enhanced (painting, landscaping), restored, or stabilized. In addition, site protection signs were installed at several sites on Manastash Ridge. Site protection was emphasized through newspaper articles and radio spots. Other public outreach programs emphasizing site protection/preservation included 13 site tours, 24 individual presentations to schools, the public, and special interest groups, displays, presentations at local science fairs, Salmon Fest, and during Washington Historic Preservation Month events.

Heritage resources were identified, documented and/or protected as a result of two Passport in Time (PIT) projects. During the Bumping Lake PIT, 100 acres were inventoried and six to ten heritage resource sites were discovered and documented. All of these sites are presently protected. Volunteers on the Tumwater Canyon PIT project conducted field surveys and tested several rock shelter sites. A total of 464 staff-hours of service were provided through these projects. An additional 120 hours of service were provided by a graduate student working on the Naches RD.

Heritage staff participated on, and/or provided information for, Forest Interdisciplinary Teams, and provided contract support and direction for private contracting firms performing surveys for special use permittees.

Recommendations Include:

Continue monitoring of active projects to insure that heritage resource management recommendations are followed.

Continue review of all proposed projects at the planning phase to ensure that potential effects are adequately addressed.

Increase emphasis on site evaluation. The Wenatchee NF has 642 unevaluated sites; project activities are currently avoiding these areas.

Increase emphasis on site identification and re-documentation. The Wenatchee NF has a number of incomplete site reports/forms that should be updated to current Standards; sites will need to be inspected. The Wenatchee NF has a number of "ticklers" (heritage resource finds pending designation as sites or isolated finds). Every effort should be made to relocate and evaluate these finds.

Monitoring Item -**CULTURAL AND HISTORICAL SITE REHABILITATION**

The goal is to rehabilitate damaged sites eligible for inclusion in the National Register of Historic Places. The monitoring question is:

For sites eligible for inclusion in the National Register of Historic Places, is appropriate stabilization or rehabilitation of damage being completed?

The Wenatchee NF currently has seven individual Memorandums of Agreement and Memorandums of Understanding that provide strict guidelines for managing (includes rehabilitation) National Register (NR) and National Register eligible sites on the Wenatchee NF. In addition, the Wenatchee NF is a signatory on two Programmatic Agreements governing the management of Depression Era (CCC) Administrative Structures on the Wenatchee NF. In Fiscal Year 1997, some of these

agreements provided guidance for the enhancement and/or rehabilitation of 14 historic properties. In one instance, preventative maintenance was conducted to protect an eligible site.

On the Chelan RD, the roof of the Steliko Work Center Barn (National Register) was replaced and the Chelan Butte Lookout (NR) was painted. At the Leavenworth RD Administrative Site (NR), landscaping was added to enhance the attraction of the CCC-era facility. On the Naches RD, projects included continued enhancement of the American Ridge Ski Lodge, with replacement of windows and doors by Kiwanis Club volunteers; flood repair work started in Fiscal Year 1996 was completed to protect the American Forks CCC shelter; and, three roofs were replaced and five eligible structures were painted at the White Pass and Chinook Work Centers. A 2-year project to restore the Red Top Lookout on the Cle Elum RD was completed. Activities done by community volunteers included the replacement of doors, windows, shutters, decking, railing, and both interior and exterior painting.

Recommendations Include:

Continue site inspections and condition assessments for National Register listed and eligible historic properties.

Work with Engineering and Facilities Staff during the project planning phase to identify treatment needs.

Monitor stream and river bank erosion near or adjacent to eligible or listed historic properties

Monitoring Item -**AMERICAN INDIANS AND THEIR CULTURE**

The monitoring questions are:

For those trust resources identified in treaties with American Indians, what are their conditions and trends?

Are sites of religious and cultural heritage adequately protected?

Do American Indians have access to, and use of Forest species, resources, and places important for cultural, subsistence, or economic reasons, particularly those identified in treaties?

The 1855 Treaty signed with the confederated tribes and bands of the Yakama Indian Nation states in Article 3:

"The exclusive right of taking fish in all the streams, where running through or bordering said reservations, is further secured to said confederated tribes and bands of Indians, as also the right of taking fish at all usual and accustomed places, in common with the citizens of the territory, and of erecting temporary buildings for curing them; together with the privilege of hunting, gathering roots and berries, and pasturing their horses and cattle upon open and unclaimed land."

Please refer to the fisheries monitoring section for information on that trust resource. Please refer to the heritage resources monitoring section for a discussion on the protection of cultural properties.

The heritage program consulted with tribes on 53 individual projects ranging from large scale watershed improvements to smaller recreational developments. Tribes are routinely included in the scoping process and receive written notification of projects (Schedule of Proposed Actions lists, project proposals, etc.). Tribes are notified about all heritage projects involving data recovery or excavation. Sites identified by American Indian tribes receive the same level of management consideration, typically protection through avoidance during project implementation. Every effort is made to identify and protect Traditional Cultural Properties (TCP). Detailed ethnographic studies, which often include discussions of TCPs, often accompany heritage resource survey reports. The nature of such properties is kept confidential and is exempt from public disclosure. Overt evidence is necessary to identify these properties and failure to share information about them may result in inadvertent impacts to a site for lack of knowledge. The Wenatchee NF is not aware of any site intrusion in Fiscal Year 1997 nor is the heritage staff aware of any violation of treaty rights regarding procurement of natural resources.

Recommendations Include:

Continue government-to-government relations with an emphasis on one-on-one consultation;

Continue to involve tribes in the early stages of project planning; and

Consider MOUs and MOAs with tribes on a project specific basis. Such documents may prove useful when sensitive sites are involved.

F. COORDINATION OF FOREST PROGRAMS WITH INDIAN TRIBES

Monitoring Item-

COORDINATION AND COMMUNICATION OF FOREST PROGRAMS WITH INDIAN TRIBES

The goal is to coordinate with appropriate Tribal representatives for all projects in which Indians may have concerns. The monitoring questions are:

Are American Indian rights being protected on National Forest lands?

Are projects with activities, or areas of concern to Indians, being coordinated with appropriate Tribal representatives?

The Wenatchee NF understands that recognition of, and the honoring of, existing treaties is crucial in government-to-government-relations with American Indian tribes. Protection of American Indian treaty and religious freedom rights is incorporated into Wenatchee NF decision-making (please refer to previous Cultural Monitoring Items). Consultation with tribes that may have an interest in management activities is initiated at the earliest stage of project planning and is carried through to completion of the project. The Memorandum of Understanding between the Yakama Indian Nation and the Forest Service continues to guide anadromous fish habitat management. The Yakama Indian Nation continues to participate in Provincial Advisory Committee activities for both the Eastern Washington Cascades Province and the Yakima Province. The Yakama Nation was active in the inter-agency implementation monitoring conducted on Wenatchee NF projects in the Eastern Washington Cascades Province in 1997. The Regional Coordinator for American Indian tribal relations is consulted as needed.

Recommendations Include:

Continued cooperation and monitoring as scheduled; and

Continued government-to-government relations.

G. SENSITIVE PLANTS, BIODIVERSITY, AND OLD GROWTH

Monitoring Item-

MAINTENANCE OF SENSITIVE PLANT POPULATIONS

The goal is to provide appropriate habitat to maintain viable populations or enhance populations of all threatened, endangered, and sensitive plant species. The monitoring question is:

Are sensitive plant species populations being maintained or increasing?

There are over 50 sensitive plants on the NF. All have limited distribution and some are in fairly inaccessible areas. One species is proposed for federal listing as endangered (Oregon Checker-mallow) and five are species of concern. The Regional Forester's Sensitive Species List is in the process of revision and this will likely be completed in Fiscal Year 1998.

All ground disturbing activities require biological evaluations for sensitive plants; this allows the effects on sensitive species to be determined, and essentially monitored on a project by project basis. The requirement to complete biological evaluations helps assure that management activities do not result in viability threats to sensitive species.

Plot techniques can also be used to intensively monitor sensitive plants. The primary criteria to determine which species are monitored are: (1) rarity of the plant, (2) threats to the plant, (3) accessibility of the plant, and (4) funding.

Sometimes a proposed project has the potential to impact sensitive species; this provides an opportunity for monitoring effects of that activity on the plant. Intensive monitoring has generally focused on rarer plants and those that have significant threats. Consequently, plants that occur in areas where management activities commonly take place often receive more attention. Plants that grow in inaccessible areas may not be monitored due to lack of threats and the physical difficulty of reaching them. Funding is also an important consideration, for monitoring is an expensive endeavor. It is difficult to initiate or continue monitoring when funds are limited and vary from year to year.

The plants that have been monitored with plot techniques since 1990 are:

Wenatchee Larkspur	Chelan rockmat
Thompson's clover	Showy stickseed
Long-sepaled globemallow	Pine broomrape
Clustered Lady's slipper	Henderson's ricegrass
Smoky Mountain Sedge	Botrychium species
Sierran cliffbrake	Seely's silene

Some monitoring activities have used very formal plot techniques while some have been much more informal and anecdotal in nature. Most of the rarest sensitive species occur on the Leavenworth RD, and as a result, most formal monitoring has occurred on that Ranger District; Leavenworth RD Personnel have also assisted the Entiat RD with formal monitoring. The Lake Wenatchee RD also used plot techniques to monitor population status for four species.

The seven species monitored using plot techniques in Fiscal Year 1997 were: Wenatchee Larkspur (*Delphinium viridescens*), Chelan rockmat (*Petrophyton cinerascens*), Showy stickseed (*Hackelia venusta*), Clustered Lady's slipper (*Cypripedium fasciculatum*), Seely's silene (*Silene seelyi*), Pine broomrape (*Orobanche pinorum*) and Long-sepaled globemallow (*Iliamna longisepala*).

On the Leavenworth and Entiat RDs morphological and general population trend data were collected on five different sensitive species listed above. Most of the data collected was a continuation of species' response to fire. Fire response studies were initiated in 1995.

Population monitoring of Wenatchee larkspur has been carried out since 1988. The Wenatchee NF continued to collect density and morphological data at the permanently established plots in Deer Park Springs and Camas Land areas. In addition, the Wenatchee NF collaborated with Washington Department of Natural Resources, Natural Areas Program to continue collecting morphological data in burned and non-burned sites. The purpose of the project is determine how this species responds to fire over a several-year period. Third year post-fire data were collected in burned and unburned larkspur plots. Preliminary results indicate that larkspur was stimulated by fire. In addition, plots at Deer Park Springs, located within the 1996 thinning and prescribed burn, were monitored.

Other species' monitoring summaries for 1997 follow:

Chelan Rockmat (PECI)

The third year of post-burn monitoring data was collected for PECI. Preliminary analysis indicates that the trend found the first and second years continued; PECI seems to tolerate fire at the burn intensity experienced in 1994.

Longsepaled Globemallow (ILLO)

The third year of post-burn monitoring on both burned and unburned sites continued. It appears that on burned sites on the Entiat RD, plants became established after the fire and have become more and more robust, although plant density is declining. Unburned plants on the Leavenworth RD have remained essentially static in size and number. On the Lake Wenatchee RD the second consecutive annual data collection of post-fire emergence populations suggests an increase in population area.

Showy Stickseed (HAVE)

Both original and outplanting populations were monitored and the general trend in population is downward. Taxonomic studies were completed and results indicate that the blue, sub-alpine populations are indeed a separate species from the white form found in Tumwater Canyon. A new species is currently being described and USFWS is preparing a listing packet for HAVE.

Clustered Ladyslipper (CYFA)

The third year of post-burn data was collected at the Mountain Home population of CYFA. Numbers of the remnant population have increased slightly and several new seedlings were established in the burned area.

Seely's Silene (SISE)

The second consecutive year preliminary monitoring results on the Lake Wenatchee RD suggest that the population is stable or increasing.

Botrychium Species (BOTRY)

Plant materials were collected for a second year for an ongoing isozyme study to determine the taxonomic relationships between several species of *Botrychiums*.

Anecdotal monitoring continued on many sensitive plant populations. Cle Elum RD personnel revisited populations of *Sarracenia* species, *Delphinium viridescens* and *Botrychium* species. All populations were still extant although the number of DEVI plants appeared to be fewer than in previous site visits. Chelan RD personnel revisited globemallow populations. Approximately 75 percent of the previously documented populations of pine broomrape (*Orobanche pinorum*) and Henderson's ricegrass (*Oryzopsis hendersonii*) on the Naches RD were revisited. Lake Wenatchee personnel re-visited several populations of Clustered Lady's slipper in the Natapoc and Butcher Creek areas.

Finally, all NEPA documents completed on the Wenatchee NF addressed sensitive plants where appropriate. Typically, the NEPA analyses used information from the required biological evaluations for plants.

Recommendations Include:

Continue to address and evaluate the effects of proposed actions on sensitive plants. Establish quantitative formal monitoring as needed to protect sensitive plants.

Monitoring Item-***BIODIVERSITY and OLD GROWTH***

The goal is to maintain native and desirable introduced or historic plant and animal species and communities. Provide all seral stages of all plant associations in a distribution and abundance to assure species diversity and viability. A desired future condition is to establish the local needs of management indicator species, rare species, and the proportion of seral stages that allows for natural diversity. The monitoring questions are:

Is the Forest ecosystem functioning as a productive and sustainable ecological unit?

Is the use of prescribed fire or fire suppression maintaining the natural processes of the Forest ecosystem?

Are desired habitat conditions for the northern spotted owl and the marbled murrelet maintained where adequate, and restored where inadequate?

Are habitat conditions for late-successional forest associated species maintained where adequate, and restored where inadequate?

Are desired habitat conditions for at-risk fish stocks maintained where adequate, and restored where inadequate?

Is a functional interacting, late-successional ecosystem maintained where adequate, and restored where inadequate?

Did silvicultural treatments benefit the creation and maintenance of late-successional conditions?

Will the overall conditions of the watersheds and provinces continue to be productive over the long-term?

Please refer to *Wildlife; Timber Offered, Harvested, and Related Silvicultural Activities; Soil, Water, Fisheries and Related Watershed Management; and Forest Fire Protection* for addition information regarding these monitoring questions.

Biodiversity is essentially the variety of life and the processes that link them together and allow them to function; therefore, the amounts, kinds and distribution of sensitive plants, old growth and noxious weeds all affect biological diversity. Monitoring of fire effects and recovery also relate to biological diversity.

Five Watershed Analysis documents were completed in Fiscal Year 1997 (Swauk, Table [revision], Rattlesnake, Oak Creek, and Chiwawa). These documents addressed biodiversity and/or the components including old growth (late-successional habitat), sensitive plants, and noxious weeds. Survey and Manage (S&M) species

were also included in these analyses as directed by the *Northwest Forest Plan*. These attributes are critical components of biological diversity. Old growth ecosystems, sensitive plants and survey and manage species are often limited in extent, and as such can significantly impact biological diversity by changes in their extent. Weeds effect biological diversity by excluding native plants. Landscape vegetation is also an indirect assessment of biological diversity.

Surveys have begun for a variety of Survey and Manage species deemed important late-successional habitat components. These include vascular plants, fungi, lichens and bryophytes (*Northwest Forest Plan ROD*, Appendix J-2). As a result of this emphasis, the Cle Elum RD documented historic location data for these species from both the University of Washington and Central Washington University as part of work completed for the Snoqualmie Pass Adaptive Management Area (AMA). Over 200 fungi specimens were also collected throughout the Snoqualmie Pass AMA area for identification and cataloging at Central Washington University. Bryophyte and Lichen surveys were also completed for two projects on the Cle Elum RD.

The Leavenworth RD completed surveys for Survey and Manage lichens, and found *Bryoria tortuosa* in several places. The Lake Wenatchee RD completed preliminary work for Survey and Manage Species. *Polyozellus multiplex* (fungus) sites were checked in the White River and Little Wenatchee drainages (fungus reported from only 10 sites within range of spotted owl). The District also established "Special Mycological Sites" (groups of survey & manage species) in the White River and Chiwawa drainages, and re-visited them for the third consecutive year. One vascular Survey & Manage species site, Candy stick (*Allotropa virgata*), was recorded and revisited in Little Wenatchee drainage. *Bryoria tortuosa* (lichen species) sites were checked in Ponderosa Estates Special Interest area and Butcher Creek proposed timber sale area.

The Entiat RD qualitative monitoring of Burned Area Emergency Rehabilitation measures continued. Other fire related monitoring included long-term vegetation transects, evaluation of the rehabilitation seeding, evaluation of channel and hillslope structures, and long-term photo-point establishment. Riparian vegetation monitoring that began in 1994 also continued.

The Leavenworth RD initiated a long-term project in 1996 to study the effects of ecosystem restoration projects, primarily thinning, and the resulting landscape on both understory and overstory species. The District Wildlife Biologist is collecting data on small mammals and birds in response to the same project. Twenty-four permanent plots were established in 12 study stands throughout the lower portion of Mission Creek. Within these plots, data were collected on species composition and cover, tree and snag density, and fuel loading. Four of the 12 study stands are to remain untreated as controls, four will receive a standard thinning treatment used elsewhere in the project area, and four will receive a thinning treatment to result in low density. The plots are to be re-sampled over an indefinite period (they were re-

sampled in 1997) to study the changes in species composition, cover, and tree and snag density. Post harvest monitoring will begin in the first season after harvest.

Recommendations include:

Continue to address biodiversity directly, or through its critical components in NEPA documents and Watershed Assessments.

Integrate assessments of Survey and Manage Species into activities as directed by the *Northwest Forest Plan*.

Noxious Weeds

There was both formal and anecdotal monitoring of weeds in 1997. The Wenatchee NF has been keeping general notes on population size of some non-natives planted near and on the Wenatchee NF in some areas. Weed monitoring also occurred in some areas following treatment. All Ranger Districts completed at least some noxious weed monitoring:

Chelan RD initiated the use of Global Positioning System to locate sub-population boundaries for Common Crupina. This work will continue in Fiscal Year 1998. In prescribed burn areas, anecdotal monitoring of weeds suggest that Dalmatian Toadflax can really expand after prescribed fire.

Cle Elum RD initiated monitoring of Orange Hawkweed on experimental control plots near Snoqualmie Pass. Also, sheep were used as a control technique for Meadow Knapweed at the Liberty Helispot, and monitoring was initiated to evaluate effectiveness. Monitoring was also initiated at Buck Meadows for noxious weeds and watershed restoration projects.

Entiat RD visited the Thompson's Clover Research Natural Area and Mill's Canyon to assess the spread of Dalmatian Toadflax.

Lake Wenatchee RD revisited and pulled *Cytisus scoparius* at four sites for third consecutive year and revisited and pulled *Potentilla recta* at two sites for second consecutive year. The District monitored two *Linaria dalmatica* sites (Highway 207 and #6100) and also monitored three road systems (6601-100, 6500, 6960) for *Centaurea diffusa*, *C. biebersteinii*, *Hypericum perforatum*, *Linaria dalmatica*, *Tanacetum vulgare*, *Leucanthemum vulgare*, and thistle spp.

Leavenworth RD monitored the Diffuse Knapweed Volunteer Pulling Project and the monitoring will continue and expand in Fiscal Year 1998. Although an excellent effort, no area met the target of having one or less living knapweed plants in any 10 X 50 foot monitoring plot.

Spot spraying of Diffuse Knapweed, Dalmatian Toadflax, St. John's Wort and Sulphur Cinquefoil was monitored and found to be an effective method of eliminating the target species while avoiding non-target species. Both glyphosate and dicamba were used and found to be highly successful.

The Leavenworth RD also keeps general notes on species and density of weeds at trail heads.

Naches RD continued anecdotal monitoring of Dalmatian Toadflax in the Clemens Mountain area. Populations of this plant were mapped and appear to be expanding. Additionally, as part of the development of a Forest-wide Noxious Weed EA, the Wenatchee NF evaluated a variety of sites for potential weed control. This essentially served as a monitoring of the status of weeds on each unit. Over 14,000 acres are being considered for weed control on the Wenatchee NF.

Old Growth Ecosystems

In the *Forest Plan*, there was estimated to be about 319,000 acres of old growth on the Wenatchee NF; most of this was in wilderness. At the end of the first decade it was predicted that 307,300 acres would remain. This came off of a suitable base acres of about 630,000. Under the *Northwest Forest Plan*, only about 209,000 acres are considered suitable. It is very unlikely that the 11,500 acres of old growth predicted for harvest in 1990 will actually be harvested in the near future. In fact, in-growth will likely grow old growth faster than the harvest rate. This is particularly true when only about 35 percent of the original suitable acres is available for harvest. Probably the biggest threat to old growth forests at this time is catastrophic fire.

In Fiscal Year 1997 approximately 5,500 acres were harvested on the Wenatchee NF. Only the 323 acres treated using a removal cut (please refer to *Silvicultural Practices Monitoring Item*) could have supported old growth stands. The actual amount of old growth harvested would be less than the 323 acres listed.

Recommendations Include:

Become more quantitative in our evaluations of weed populations and continue to seek ways to prevent noxious weed infestations.

Evaluate weed potential for all ground disturbing projects.

Continue to monitor old growth acres harvested and address in NEPA documents.

H. WILDLIFE

Management Indicator Species Habitat

Management Indicator Species are plant or animals species whose population characteristics can be used to evaluate the effects of land and resource management practices on the habitats they use.

Monitoring Item -

OLD GROWTH AND MATURE HABITAT

INDICATORS: spotted owl, pileated woodpecker, marten and northern three-toed woodpecker.

The goal of the indicator species program is to provide habitat to maintain viable populations of all old growth and mature habitat vertebrate species on the Wenatchee NF. The monitoring questions are:

Are Forest Plan allocated sites being maintained?

Are established sites being used by indicator species?

Most spotted owl sites were monitored by the National Council for Air and Stream Improvement (NACSI) or the Pacific Northwest Research Lab (PNW) (168,976 acres) for research purposes, or by the Wenatchee NF (17,332 acres) for project implementation in 1997 (*1997 Wildlife, Fish, Rare Plant Report*). The hard winter may have lowered the number of sites with active adults that are nesting; therefore, the acreage accomplished in 1997 is lower than 1996. The number of young produced from all nests was low with a good number of nest sites without any adults. In the State of Washington a large percentage of the young came from the Wenatchee NF.

All projects with any effects on threatened and endangered species must meet the Endangered Species Act; this requires all federal agencies to review actions authorized, funded, or carried out by them to insure such actions do not jeopardize the continued existence of listed species. All projects that affected spotted owl habitat have been through this screen. In 1997 few acres of spotted owl habitat were degraded or eliminated, 160 acres of habitat were restored, and 60 structure were completed (*1997 Wildlife, Fish, Rare Plant Report*). Most of this work was accomplished through partnerships.

The Wenatchee NF finished the Snoqualmie Pass AMA Plan in 1997 which addressed one of the two major potential connectivity barriers on Wenatchee NF between Late-Successional Reserves. The Wenatchee NF also completed individual Late-Successional Reserve (LSR) Plans. Some *Dry Site Strategy* projects were completed in 1997 and will be implemented in 1998. Other project plans are in process to help old growth species.

NORTHERN SPOTTED OWL

Spotted Owl Information

Fiscal Year	Pairs	Resident Singles	Other Singles	Fledged Owls	Owls Banded	Owls/Radio Transmitter
1989	55	NA	72	NA	50	0
1990	116	6	81	NA	200	18
1991	146	24	60	98	95	29
1992	164	20	67	207	215	74
1993	174	26	69	38	58	16
1994	181	6	46	128	182	45
1995	141	9	44	74	150	46
1996	141	9	48	83	90	15
1997	na	na	na	na	na	na

NA = Not Available. Information has been collected but not yet prepared for this report; this information will be available in June, 1998.

The banding and inventory work by NACSI completed 8 years of data gathering and is planned to continue into 1998. The Pacific Northwest Lab is continuing research in the Cle Elum area using radio telemetry equipment in 1998. Updated reports from these partners are not available at the time of this Report, but will be discussed in the 1998 Monitoring Report.

Recommendations Include:

Track old growth and mature habitat to provide for all wildlife species. Track habitat by dry, mesic mixed, moist, high elevation, riparian dry and wet riparian groupings.

The LSR Plan identified acres of habitat per owl pair within and outside LSRs along with a monitoring plan. For the 1998 Monitoring Report include the reproduction of owl pairs, acres of habitat per pair, and the acres of suitable habitat degraded or eliminated during the year. The data will show if "the acres allocated to sites are being maintained and if established sites are being used by indicator species" (spotted owl). Information has not been analyzed for this Report.

PILEATED WOODPECKER, NORTHERN THREE-TOED WOODPECKER AND MARTEN

Spotted owls, pileated woodpeckers, northern three-toed woodpecker, and marten are all indicators for mature and old growth habitat and are affected by changes in this habitat.

Pileated Woodpecker Information

Fiscal Year	Estimated Population	Acres Inventoried	Acres Improved	Structural Improvements
1990	380	0	0	0
1991	380	100	25	20
1992	380	7,300	0	0
1993	380	1,800	110	0
1994	380	400	227	197
1995	380	700	664	107
1996	380	0	0	50
1997	380	*	*	*

* In 1997 acres inventoried, acres restored and structural improvements are reported under Cavity Dependent species as a group and not as individual species.

Populations estimates are from models based on insufficient information, therefore trends are shown as no change. Actual populations are unknown. Some inventory and improvement of habitat work is being done.

Northern Three Toed Woodpecker Information

Fiscal Year	Estimated Population	Acres Inventoried	Acres Improved	Structural Improvements
1990	UNKNOWN	0	0	0
1991	UNKNOWN	20	0	0
1992	800-1200	3,100	0	0
1993	800-1200	1,100	40	0
1994	800-1200	1,000	227	220
1995	900-1300	3,600	664	124
1996	900-1300	200	100	20
1997	900-1300	*	*	*

* In 1997 acres inventoried, acres restored and structural improvements are reported under Cavity Dependent species as a group and not as individual species.

Populations estimates are from models based on insufficient information, therefore trends are shown as no change. Actual populations are unknown. Some inventory and improvement of habitat work is being done.

Marten Information

Fiscal Year	Estimated Population	Acres Inventoried	Acres Improved	Structural Improvements
1990	1200	0	0	0
1991	1200	1,100	0	0
1992	1200	5,600	0	30
1993	1200	1,300	100	3
1994	1200	2,600	0	7
1995	1200	21,922	0	66
1996	1200	6,000	0	0

Populations estimates are from models based on insufficient information, therefore trends are shown as no change. Actual population information is shown and analyzed somewhat in second table for marten. From these tables it can be determined that the Forests knowledge about this species is increasing yearly and cumulatively.

Marten Observations

Year	General Observations	# Marten Reported	# Survey Stations	# Marten Located
Pre 1989	33	38	0	0
1990	14	14	27	8
1991	9	13	62	8
1992	6	6	0	0
1993	7	7	6	2
1994	4	4	8	0
1995	3	3	67	12
1996	0	0	32	2
1997	0	0	8	0

Recommendations Include:

The following should be the questions for monitoring for mature and old growth indicator species. The areas being maintained for old growth and mature species have changed since 1989 (from spots (OG-1 and OG-2 to LSRs and MLSRs).

- a) Are populations being maintained as predicted?
- b) Is habitat capability (quality and quantity) and distribution being maintained as predicted?
- c) Is there connectivity between areas being managed for old growth and mature habitat?

Improve monitoring data management and complete analysis of data.

Monitoring Item-**MOUNTAIN GOAT HABITAT**

The goal is to maintain or increase populations and to provide animals for recreational enjoyment. The concern is to maintain or increase sub-populations. The monitoring questions are:

Are Forest Plan allocated sites being maintained?

Are established sites being used by indicator species?

The *Forest Plan* allocated sites are being maintained as there was no disturbance to the sites. Habitat quality and mountain goat populations are decreasing in Chelan County. The population trends on the South end of the Wenatchee NF appear to be stable. These trends have been documented by the Washington Department of Wildlife (WDFW) in inventories of mountain goat populations. In 1997, the Wenatchee NF and WDFW agreed to study why populations are decreasing in Chelan County and what actions are likely to reverse this trend. This is not a high priority project, but will continue to be carried forward until some actions are planned.

Mountain Goat Information

Fiscal Year	Estimated Population	Acres Inventoried	Acres Improved	Structures Improved
1990	1600	0	0	0
1991	1600	5,000	0	0
1992	1600	2,550	150	0
1993	1600	36,650	150	100
1994	1600	12,000	0	0
1995	<1600	8,050	0	100
1996	<1600	19,000	0	0
1997	<1600	640	0	0

There is likely significantly more information available than shows up in this table. This is indicated by the amount of change in the data from last year and no information entered for 1997. By next year there should be additional information added to this table. Drawing conclusions from this information is impossible at this time except to know they are present and some level of monitoring is occurring.

Mountain Goat Observations

Year	General Observations	# Mountain Goats Reported	# Survey Stations	# Mountain Goats Located
Pre-1989	55	445	0	0
1990	4	17	0	0
1991	2	5	0	0
1992	2	24	8	8
1993	2	3	0	0
1994	18	104	48	180
1995	7	24	31	109
1996	3	3	164	159
1997	na	na	na	na

NA = Not Available. Information has been collected but not yet prepared for this report; this information will be available in June, 1998.

Recommendations Include:

Analyze existing data to determine priority and needs for management of mountain goats.

Develop management strategy to reduce conflicts between goats and human use, especially Off Road Vehicles and Four Wheel Drives.

Monitoring Item-**DEER AND ELK HABITAT (BIG GAME INDICATOR SPECIES)**

The goal is to maintain habitat capability to support populations identified in the *Forest Plan* and provide animals for recreation enjoyment. The monitoring questions are:

Are populations being maintained as predicted?

Is habitat capability being maintained?

Watershed Assessments continue to indicate that elk use of forage in meadows is exceeding *Forest Plan* Standards. High amounts of rain late into the spring provided a higher level of forage and increased production of calves in 1996 and 1997.

The Yakima and Clockum Elk Herd plans are in review status. The Yakima herd is at population objectives and the Clockum herd is below population objectives. The Wenatchee NF manages the majority of land for both herds; and most of the winter habitat is on Washington Department of Fish and Wildlife lands. Due to the changes in hunting regulations 3 to 4 years ago, there are now significant numbers of large bulls.

Washington Department of Fish and Wildlife and the Wenatchee NF have agreed to develop a Memorandum of Understanding (MOU) for closer coordination between the agencies regarding elk management. Agreements are that WDFW show the potential for elk habitat and the Wenatchee NF show the effects of resource management on that potential habitat; it will take a number of years to establish potential and effects of resources (this will likely occur with the next *Forest Plan* revision).

The Wenatchee NF needs to improve more habitat to maintain elk populations; the MOU being developed should identify improvements needed by area. There were 150 acres of elk habitat restored in 1997. Both agencies have concerns about maintaining deer where there are elk herds. How to implement the deer and elk populations will be worked on in the next few years.

Deer numbers have decreased in reaction to the 1994 fires which burned significant portions of winter range. The winter of 1997 had heavy snow and deer populations were reduced by 50 percent or more. Deer were in poor shape after the winter, resulting in low reproduction rates. Deer populations are well below population objectives. The hunting season was shortened by 1 week this year and only

bucks with 3 points or better were allowed in the harvest. The buck harvest was the lowest in the last 40 years.

Memorandums of Understanding on mule deer are being worked on that would prioritize habitat improvements. The Wenatchee NF completed 338 acres of restoration, 90 structures and 1,682 acres of surveys for mule deer.

White-tailed deer and moose sightings are being tracked as these two species appear to be increasing.

Recommendations Include:

Monitor deer and elk use of winter ranges.

Coordinate with the Washington Department of Fish and Wildlife on maintaining healthy deer and elk herds. Agree on additional desired future conditions and ways to get to those conditions (this was worked on in 1997 and will continue into 1998).

Develop a plan for management of deer and elk (this began in 1997).

Enter into projects to improve elk use of the landscape with Washington Department of Fish and Wildlife, Yakama Indian Nation, Rocky Mountain Elk Foundation, and others. Agree on monitoring items and monitor to see if projects meet their objectives (an MOU is drafted).

Monitoring Item-

PRIMARY CAVITY EXCAVATORS

(Indicator Species for dead and defective trees)

The goal is to provide habitat to maintain viable populations. Maintain number, size and distribution of trees and snags to meet habitat capability objectives by management area. The monitoring questions are:

Are primary cavity excavator habitat and replacement trees being left in the proper numbers, sizes and distribution?

Is the habitat being utilized as expected?

Are down trees being provided?

Primary cavity excavator habitat needs to be better defined and information collected on a landscape level to determine trends. Every acre provides some primary cavity excavator habitat (1 to 100 percent of potential). Even though the Wenatchee NF meets the guidelines, the trend of snags and primary cavity excavators has not been determined for the Forest, a watershed, or a drainage.

Late-Successional Reserves, Adaptive Management Areas, and watershed analyses used the new snag guidelines. Most watershed plans have not adequately identified trends or problems associated with snags or primary cavity excavators.

Primary Cavity Excavator Information

Fiscal Year	Estimated Habitat (forested acres)	Acres Inventoried	Acres Improved	Structural Improvements
1990	1,550,000	NC	0	0
1991	1,550,000	720	0	236
1992	1,550,000	13,262	147	63
1993	1,550,000	2,400	2,950	154
1994	<1,550,000	2,300	217	251
1995	<1,550,000	5,770	644	220
1996	<1,550,000	2,000	290	95
1997	<1,550,000	1,578	0	280

Recommendations Include:

Complete a Primary Cavity Excavator Habitat Conservation Plan that identifies how to monitor trends of populations and habitat.

In the dry forest, increase the numbers of large (20" DBH-diameter breast height) trees and snags while reducing the potential of wildfires to significantly impact the future populations of large snag habitat. (being implemented in projects).

Load surveys into database and complete analysis for monitoring.

Proposed, Endangered And Threatened Species

The goal is to manage key habitat to improve status of threatened or endangered species to a point where they no longer need protection under the Endangered Species Act.

Endangered and threatened wildlife species found on the Wenatchee NF are the bald eagle, peregrine falcon, grizzly bear, gray wolf, northern spotted owl and marbled murrelet. All reported sightings of threatened and endangered species were documented and, except for the spotted owl, all known sightings have been entered in WILDOBS; the database has made information more accessible and more frequently used in assessments.

The spotted owl has been discussed in the *Indicator Species* section of this Report.

Monitoring Item-

BALD EAGLE HABITAT (threatened species)

Monitoring questions include:

Are existing nest sites producing young as anticipated?

Are nest, roost and perch sites being maintained?

The number of active nests is slowly and steadily increasing. The number of young and the number of nest sites have not reached recovery goals for the Wenatchee NF. If habitat improvements for lakes, riparian habitat, and fish populations continue there is potential to achieve recovery goals in 5 to 10 years.

The most limiting factor for eagles is thought to be food. Since eagles use waterfowl and fish on rivers and reservoirs, this is where food sources are needed. In reviewing large lakes on the Wenatchee NF it is apparent that those which have been raised lost a great deal of potential to produce waterfowl and fish. Replacing dead trees along the lakes would create nutrients, cover, and warmer water for increased food production for fish and waterfowl. The wood component was present naturally, but in raising lakes for electricity or for irrigation these components were removed and continue to be removed.

The 34 potential bald eagle nest areas and priority nest stands have been entered into GIS and are available for project assessments. These should be the sites evaluated for eagle nesting.

Bald Eagle Information

Fiscal Year	Potential Nest Sites	Existing Nest Sites	Young Produced	Acres Inventoried	Acres Improved	Structures Restored
1989	1	1	1	NC	0	0
1990	34	2	2	NC	0	0
1991	34	2	2	1,800	0	0
1992	34	3	2	1,000	0	0
1993	34	4	4	2,650	160	0
1994	34	4	6	1,400	0	0
1995	34	4	7	2,445	0	0
1996	34	5	3	1,000	2,625	0
1997	34	5	4	730	53	10

Data are available back to 1985.

Recommendations Include:

- Continue to expand work on eagles to achieve recovery goals.
- Inventory and maintain roost and perch sites.
- Develop site management plans for active bald eagle sites.
- Use surveys to document eagle habitat and population trends.
- Increase waterfowl and fish through restoration projects for eagle food.

Monitoring Item-

PEREGRINE FALCONS (endangered species)

Monitoring questions include:

Are recovery sites being maintained?

Are sites occupied?

Additional helicopter cliff surveys were completed in 1997; it is planned to complete the cliff surveys of the Wenatchee NF in 1998. A peregrine falcon was seen in the vicinity of Lake Chelan during these surveys; there is a likely a nest in that vicinity. Ground verification is needed for the sites located in 1996, as well as 1997, to determine species and reproduction of these sites.

The Wenatchee NF has achieved and exceeded the recovery goal of one active nest site. Reproduction is high at the nest sites. A fire occurred near one site in the Summer of 1997. There were four young around this nest during the fire. Apparently, the fire activities were late enough in the year to not affect survival or reuse of the nest in 1998. However, there will probably be constraints on fire salvage; this may not allow salvage of the fire killed trees while they still have high value.

New data on potential sites were entered into GIS and WILDOBS databases in 1997. All "good or better" rated cliffs for peregrine nests have been entered into GIS and should be used to complete project assessments.

Peregrine Falcon Information

Fiscal Year	Number Hatched	Potential Nest Sites	Existing Nest Sites	Young Produced	Acres Inventoried	Acres Improved
1988	0	unknown	0	0	0	0
1989	5	80	0	0	5,000	1
1990	5	80	0	0	500	0
1991	11	80	0	0	500	1
1992	6	80	1	3	1,000	0
1993	5	80	1	2	1,000	0
1994	5	81	2	5	1,500	0
1995	0	82	2	5	2,000	0
1996	0	75	2-10	4	13,300	300
1997	0	75	2-10	7	8,109	53

Recommendations Include:

Continue to monitor potential and active nest sites.

Prepare site management plans for known nest sites.

Monitoring Item-

GRIZZLY BEAR (*threatened species*)

The monitoring question is:

Are Guidelines for the North Cascade Grizzly Bear Recovery Area being implemented as they become established?

The Grizzly Bear Recovery Plan is close to completion.

Grizzly Bear Information

Fiscal Year	Potential Den Sites	Existing Den Sites	Young Produced	Acres Inventoried	Acres Improved	Structures Improved
1994	UNKNOWN	U	0	1,000	117	5
1995	UNKNOWN	U	0	500	114	5
1996	UNKNOWN	U	0	3,520	1,675	6
1997	UNKNOWN	U	0	0	612	4

Recommendations Include:

A decision on finalizing the recovery plan is needed (actions to resolve recovery are being evaluated and plans developed in 1998).

Monitoring Item-

GRAY WOLF (*endangered species*)

The monitoring question is:

Is habitat capability on an increasing trend?

From 1996 to 1997 the information in this table has been updated. Data indicate presence of wolves and amount of effort being expended to locate them.

Little has changed for the wolf in 1997 and little is planned to change in 1998. The trend of wolves is likely an increasing population even though the prey is thought to be decreasing. The *Dry Site Strategy* and wildfires should soon begin changing the trend of wolf habitat.

Gray Wolf Observations

Fiscal Year	General Observations	# Wolves Reported	# Survey Stations	# Wolves Located
Pre 1989	53	73	0	0
1990	23	31	0	0
1991	37	46	76	7
1992	49	62	64	3
1993	30	36	56	0
1994	10	11	118	8
1995	16	25	10	0
1996	20	29	28	0
1997	2	2	0	0

Gray Wolf Information

Fiscal Year	Acres Inventoryed	Acres Restored	Structures Improved
1994	71,000	0	5
1995	17,200	0	0
1996	118,570	775	6
1997	91,634	569	4

Recommendations Include:

Inventory to locate dens and verify wolf use on the Wenatchee NF.

Develop a recovery plan for this area.

Analyze monitoring surveys. Prepare long-term monitoring plans and maps of survey routes and wolf sightings.

Monitoring Item-

MARBLED MURRELET (*threatened species*)

Monitoring question.

Are populations and habitat being maintained?

Fifty acres were surveyed in 1996 and 2,170 in 1997 for marbled murrelet; no new sightings were found on the Wenatchee NF.

Plum Creek Timber Company has completed some surveys for murrelet as part of their road access requests. These surveys have not been entered into the Wenatchee NF database and analyzed; no marbled murrelet were located.

Marbled Murrelet Observations

Year	General Observations	# Marbled Murrelet Reported	# Survey Station	# Marbled Murrelet Located
Pre-1989	0	0	0	0
1990	0	0	0	0
1991	0	0	0	0
1992	0	0	0	0
1993	0	0	0	0
1994	1	1	13	0
1995	0	0	14	0
1996	0	0	5	0
1997	0	0	5	0

Recommendations Include:

Continue to monitor projects within the range of the species.

Monitoring Item-

**HABITAT AND SPECIES IDENTIFIED AS CANDIDATES
FOR THREATENED STATUS (sensitive species)**

Monitoring question:

Is habitat capability on an increasing trend?

Candidate species and sensitive species are not the same list. The Candidate List is a United States Fish and Wildlife Service (USFWS) list and the Sensitive List is the Forest Service list. The Sensitive Species List has not been officially updated since 1989 in the Region, and 1990 for the Wenatchee NF when the list was identified in the *Forest Plan*.

BIGHORN SHEEP

Washington Department of Fish and Wildlife has completed a Bighorn Sheep Plan for Washington State; the agency has proposed introduction of bighorn sheep in the Tieton watershed in 1997. Release of animals is planned for March 1998.

Washington Department of Fish and Wildlife and the Chelan RD are working on a Memorandum of Understanding (MOU) for the Chelan Lake watershed; this may lead to reintroduction of bighorn sheep in the next few years.

The Entiat RD is considering an MOU for the Swakane herd for coordination of improvements. As with all bighorn sheep areas there are conflicts between domestic and bighorn sheep.

Recommendations Include:

Develop partnerships with Bighorn Sheep Foundation and Washington Department of Fish and Wildlife to increase bighorn sheep.

Prepare a plan for the area from the Wenatchee River north to the Okanogan National Forest. A Memorandum of Understanding with Washington State Department of Wildlife is in process, and it will look at habitat and other resource conflicts.

Enter survey data into WILDOBS and complete an analysis of data to answer monitoring questions.

TOWNSEND'S BIG EARED BAT

Habitat is being maintained through implementation of the Boulder Cave Management Plan which has provided winter use restrictions and limited human access.

The habitat and populations in Boulder Cave are being monitored and appear to be the same in 1996 and 1997. The part of the cave thought to be a nursery area had gates established in 1997 to keep out human visitors. This project was unique in that it was also a training project for others who need to install gates.

In 1997, some ANABAT (records bat sounds) work was continued; these machines may not be as effective as originally thought.

Two hundred and fifty acres of habitat were restored two structures established in Fiscal Year 1997 to attract Big Eared Bats. One acre of inventory in Boulder cave was completed and about 60 bridges surveyed; wooden bridges with preservatives were found to have no use, flat bottom bridges had no use or slight use, and I-beam bridges appeared to have the most use of bridges. Further work is needed to identify species, numbers and times of bridge use.

Recommendations Include:

Locate and protect the reproductive site or sites for the Boulder Cave population.

Inventory habitat and species to determine their range.

Inventory structures to locate bat populations.

CANADIAN LYNX

Habitat maps have been created. Historic as well as new sightings are being located and entered into the WILDOBS database. It has been verified that lynx once were found on all six RDs of the Wenatchee NF. Today it has been verified that lynx are found on Chelan and Entiat RDs and may be present on the other four Ranger Districts. Hair snare surveys are planned for Fiscal Year 1998 to verify presence or absence of lynx on the southern four Ranger Districts.

Additional historic information was located in 1997; likely there is additional lynx inventory information from 1997 to be added to the following table in 1998.

A management guide for lynx was published in 1997. Inventories were completed on 9,500 acres and two structures for lynx were completed (*1997 Wildlife, Fish, Rare Plants Report*).

Lynx Observations

Year	General Observations	# Lynx Reported	# Survey Stations	# Lynx Located
Pre-1989	26	26	0	0
1990	2	4	0	0
1991	5	5	0	0
1992	5	6	0	0
1993	2	2	35	2
1994	0	0	85	7
1995	1	1	116	3
1996	1	1	135	0
1997	4	4	9	1

Recommendations Include:

Surveys are needed throughout lynx habitat to determine if populations are present and their condition. Report sightings of these species and enter in WILDOBS database.

CALIFORNIA WOLVERINE

In 1996 (reported in 1997) a Wenatchee NF visitor took pictures of a wolverine crossing a road on the Leavenworth RD; this is a verification of wolverine presence on the Wenatchee NF.

Habitat was likely stable for 1996 and 1997, but population trends have not been determined. Indications are that populations are small (5 to 20 animals).

In 1997 12,000 acres were surveyed for wolverine. Four structures were built, and 53 acres of wolverine habitat were restored. There was an airplane survey during the winter of 1997 that did not locate wolverine on the Wenatchee NF.

Wolverine Observations

Year	General Observations	# Wolverine Reported	# Survey Stations	# Wolverine Located
Pre 1989	16	16	0	0
1990	0	0	0	0
1991	1	1	0	0
1992	1	1	0	0
1993	1	1	0	0
1994	0	0	0	0
1995	3	3	6	1
1996	1	1	32	0
1997	0	0	8	0

Recommendations Include:

Surveys are needed throughout Wolverine habitat to determine if populations are present and their condition.

FERRUGINOUS HAWK

Habitat is being maintained. There are very few sightings of ferruginous hawks on the Wenatchee NF. Reproduction is probably not occurring on Wenatchee NF; however, hawks may use the Wenatchee NF for feeding and during migration.

Recommendations Include:

Take this species off the sensitive species list for the Wenatchee NF.

COMMON LOON

Few of the loon observations indicate reproduction. Information shows loons, and reproduction, are rare. Habitat and population trends are unknown.

There are opportunities to increase nesting habitat along the shores of lakes and increase habitat and likely populations. In reviewing large lakes on the Wenatchee NF it is apparent that those which have been raised lost a great deal of their potential to produce waterfowl and fish. Replacing dead trees along the lakes would create nutrients, cover and warmer water for increased food production for loons. The wood component was present naturally, but in raising lakes for electricity or for irrigation these components were removed and continue to be removed. For loons, trees or a raft of trees, often act as floating nest islands. Floating nest site have reduced terrestrial predation and it is thought that these floating trees are able to absorb waves created by power boat users if the waves are not to large. Restoration of woody debris in lakes and location of loon nest sites is needed to maintain populations of loons.

Common Loon Observations

Year	General Observations	# Loons Reported	# Survey Stations	# Wolves Located
Pre 1989	6	10	0	0
1990	2	2	0	0
1991	1	1	0	0
1992	4	5	0	0
1993	8	20	0	0
1994	14	16	0	0
1995	4	4	0	0
1996	10	22	0	0
1997	0	0	0	0

Recommendations Include:

Establish a protocol and plan for inventorying habitat and species.

Began to systematically survey for species use.

Develop maps of habitat and population trends.

Work cooperatively with Public Utility Districts and Bureau of Reclamation on water releases, timing and nesting habitat along shores of lakes to increase potential for reproduction.

HARLEQUIN DUCK

All data for 1996 and 1997 may not be entered in the database. Harlequins are not common, but they are not difficult to locate; young have been located a number of times. The observation data need to be mapped and an analysis made to determine potential habitat. Some maps have been made of potential habitat, but no Forest-wide effort considering all data presently available.

In 1997, 340 acres of habitat were restored, four structures completed, and 200 acres surveyed for Harlequin ducks.

Habitat is changing above and below dams due to management of water levels due to flood events. These changes affect the amount of feeding habitat available and likely nesting success. Populations are low (this may be the natural condition for this Forest) and trend of habitat and populations is unknown.

Harlequin Duck Observations

Year	General Observations	# Harlequins Reported	# Survey Stations	# Harlequins Located
Pre 1989	7	12	0	0
1990	9	13	0	0
1991	5	5	0	0
1992	27	38	0	0
1993	16	40	2	7
1994	34	54	7	11
1995	34	84	5	14
1996	5	10	5	8
1997	7	16	0	0

Recommendations Include:

Establish a protocol and plan for inventorying habitat and species.

Develop maps of habitat and population trends.

Work cooperatively with Public Utility Districts and Bureau of Reclamation on water releases, timing and nesting habitat along rivers to increase potential for reproduction.

RED-LEGGED FROG, LARCH MOUNTAIN SALAMANDER AND WESTERN POND TURTLE

Studies indicate that amphibian populations are on a downward trend nationally. There are many reasons for this downward trend; some reasons may be related to naturally changing conditions, while others may be due to increases in human population.

For most amphibians, habitat is limited to sites with high water tables for reproduction. This habitat is decreasing in amount and availability to wildlife as it is used by recreationists, livestock, and roads. As traffic increases on roads more amphibians will be killed as they try to cross roads to other habitat. This loss of population may or may not be compensated by natural reproduction at these sites. Mitigation can be closing roads or providing ways for these species to move under roads.

There is likely a connection between raising the water levels of lakes with dams, plus fluctuating water levels, on amphibian and turtle populations. First, the shallow water that took thousands of years to build up from erosion and deposition, is now deep water when dams are built and water levels raised; habitat is changed, likely reduced. Fluctuating water levels are not how amphibians' life cycles developed over millions of years.

In review of large lakes on the Wenatchee NF it is apparent that those which have been raised have lost a great deal of the dead trees that occurred naturally (please refer to *Common Loon Monitoring Item*) There are over 50,000 acres of lakes on the Wenatchee NF, and most of these acres are deficient in dead trees along the banks in the water. Replacement of this habitat would be restoration of the natural structure and components important to amphibians and turtles.

From data available in 1995, maps have been developed to show distribution of some amphibian species. Additional information has been collected to determine the range of these species and their population and habitat trends in 1996 and 1997, and is planned in 1998. It is thought the sensitive species Van Dykes Salamander may inhabit the Wenatchee NF.

Twenty-five acres were surveyed for Larch Mountain Salamanders; Salamanders were located at two new sites in 1997. The Wenatchee NF has three known locations for this species; a major survey effort to locate more sites is underway for 1998.

In review of archeological information on, or near, the Wenatchee NF, it is apparent that turtles were part of the food supply for native Indians. Turtles were probably much more abundant historically than they are now.

Recommendations Include:

Survey ponds, seeps and marshlands on the Wenatchee NF; survey for amphibians and reptiles around wetland and lake habitats.

Survey for Larch Mountain and Van Dykes Salamander.

Monitor to determine amphibian population declines from roads.

Watershed assessments need to consider lakes and the need to improve habitat.

FISHER

Monitoring with cameras has failed to show a single fisher. Fisher may not be present and there may not have been many in the past. A Forest Service biologist concluded that there are many habitat openings for good fisher habitat; and there are many large predators in this area that could feed upon fisher (cougar, bear). The 1997 survey information will be loaded into database and further analysis completed.

Fisher sightings have been entered in WILDOBS, and are available for use in trying to verify fisher existence in this area. In 1997, 266 acres were restored, 30 structures completed and 9,400 acres surveyed for fisher.

Fisher Observations

Year	General Observations	# Fisher Reported	# Survey Stations	# Fishers Located
Pre 1989	18	18	0	0
1990	5	5	1	1
1991	2	2	0	0
1992	1	1	0	0
1993	2	2	1	1
1994	0	0	0	0
1995	2	2	50	0
1996	1	1	38	0
1997	0	0	0	0

Recommendations Include:

If fisher are found cooperate with the Forestry Sciences Lab to locate other populations and identify what habitat is being used.

Review the potential for populations for fisher on the Wenatchee NF; determine where and how much potential habitat may be available.

GOSHAWK

Again in 1997, the goshawk was discussed as a potential for listing as threatened. As a result, it was decided this species will be tracked in the *Monitoring Report* until a decision is made on whether or not to list the species. A resolution of this issue could occur in 1998.

For the Wenatchee NF, information indicates that most of the goshawk nests are located in wildernesses or late-successional reserves. The information available also indicates there are a good number of goshawks on the Wenatchee NF.

The data in the following table represent information gathered over a number of years; and, represents about 60 percent of the information available on this species. In comparison to other species that are sensitive or listed as threatened or endangered, goshawk sightings are made with little effort.

Goshawks are collected from nests on the Wenatchee NF by falconers; Washington Department of Fish and Wildlife issues permits to collect some goshawks every year. Much of the survey work on Wenatchee NF is by WDFW monitoring effects of falconer collections.

Goshawk Observations

Year	General Observations	# Goshawk Reported	# Survey Stations	# Goshawk Located	# Goshawk Nests
Pre-1989	113	148	18	10	61
1990	38	48	2	4	16
1991	14	20	4	4	14
1992	82	110	46	51	91
1993	29	41	64	33	26
1994	30	36	13	18	19
1995	39	47	17	13	15
1996	10	11	59	55	26
1997	27	29	15	15	7

OTHER WILDLIFE

Monitoring Item-

HAWK AND OWL NEST SITES

The goal is to maintain viable populations and provide animals for recreation enjoyment. The monitoring question is:

Are nest sites being protected during implementation of habitat disturbing activities?

In most cases, all known nests were protected. It is a high priority to enter nest sites into WILDOBS and get UTM coordinates so sites can be tracked and mapped using GIS; this process continued in 1997.

All projects consider known nest locations of hawks and owls in project design. Project conservation measures are planned for protection on a site by site basis. No significant changes were made in protection of nest sites in 1997. There is likely more information on nest sites available at Ranger Districts that is not included in the following table.

On the Chelan RD a number of reports were made of great gray owl juvenile observations. Follow-up work was not able to verify these reports, but further work will be completed in 1998 to locate a nest in the area.

Great gray owl nest boxes were put up on some Ranger Districts in 1997 to try and locate nesting gray owls on the Wenatchee NF. No great gray owls were found using these sites. Great gray owl protocol surveys were completed on all Ranger Districts in 1997; no great gray owls nests were found.

On the Entiat RD a northern hawkowl nest with young was reported; follow-up work was not able to verify this nest. The year before a hawkowl was verified within 1 mile of this site.

Known Raptor Nest Sites (January 1, 1998)

Raptor Name	# Known Nest Sites
American Kestrel	2
Bald Eagle	5
Barred Owl	6
Burrowing Owl	1
Cooper's Hawk	12
flammulated Owl	1
Golden Eagle	11
Northern Goshawk	166
Great Horned Owl	3
Long Eared Owl	1
Osprey	57
Peregrine Falcon	2
Prairie Falcon	16
Red Tailed Hawk	15
Sharp-shinned Hawk	7
Spotted Owl	141

Recommendations Include:

Survey for a wider variety of species and complete pre-activity surveys to locate nests on all projects.

Visit known nests and determine: whether they are active or not, any reproductive data, and UTM coordinates.

Enter data into WILDOBS database with UTM coordinates.

SNAILS

The monitoring questions are:

Are species present?

Are species and habitat being protected?

The *Northwest Forest Plan* does not require surveys for snails, and only protection of known sites in 1996. Some inventory work was completed in 1997 for these species. In 1998 and 1999 more surveys for these species will occur per Survey and Manage requirements.

All sites known before 1995 were protected. A number of species were found that had not been found here before. No actions have been taken in 1997 on these potential new species. The management and protection for this group of species has not changed since 1995.

Recommendations Include:

Continue monitoring as scheduled.

Monitoring Item-***RIPARIAN FOR WILDLIFE (Indicators)***

The goal is to provide habitat to maintain viable populations. Maintain number, size and distribution of trees and snags to meet habitat capability objectives by management area. The monitoring questions are:

Are populations being maintained as predicted?

Is habitat capability being maintained?

Since the implementation of the *Northwest Forest Plan* riparian and water habitats have been maintained, or actions taken to improve this habitat through the *Jobs-in-Woods* program.

The Wenatchee NF began developing wildlife projects for waterfowl, and should emphasize waterfowl management in Fiscal Years 1998 and 1999. Education materials concerning the need for ponds, duck nests, and habitat improvements around lakes are being developed.

Some use surveys of waterfowl on lakes began, and information collected by Washington Department of Fish and Wildlife was gathered. A plan was worked on with Intermountain Joint Venture. Please refer to *Sensitive Species* Monitoring Item for further information.

There were 508 acres of improvements, 12 structures built, plus 220 acres of inventories completed in Fiscal Year 1997.

Recommendations Include:

Complete entering existing inventories into WILDOBS database and complete an analysis of current information.

Design inventory plans that will show population trends.

Waterfowl, riparian and amphibians should be emphasis areas for wildlife; the *Northwest Forest Plan* emphasizes water related habitat and vegetation.

I. TIMBER OFFERED, HARVESTED, AND RELATED SILVICULTURAL ACTIVITIES

Monitoring Item-

TIMBER OFFERED (ALLOWABLE SALE QUANTITY (ASQ) AND TIMBER SALE PROGRAM QUANTITY (TSPQ))

The goal is to achieve planned and assumed volumes of timber sold annually and for the planning period in ASQ and TSPQ for the period from Fiscal Year 1990 to 1993. From 1994, the goal has been amended by the *Northwest Forest Plan*. The new term to describe timber offered under the amended *Forest Plan* is called "probable sale quantity" (PSQ). The objective is to estimate sale levels likely to be achieved (PSQ) as opposed to estimating ceiling or upper-limit harvest levels (ASQ). The PSQ in the *Forest Plan* is to sell 24.2 million board feet per year.

Timber harvested during the Fiscal Year 1997, as reported in the Timber Sale Program Information Reporting System, Source and Application of Funds Worksheet was 56.4 MMBF. Timber Commodity was 10.0 MMBF, Forest Stewardship was 42.6 MMBF, and Personal Use was 3.8 MMBF.

Another indicator utilized is the Program Sale Statement (PSS). The PSS is used as a source of annual program accomplishment in terms of area and volume by timberland suitability class, harvest activity, forest-type group, and product. Cumulatively, this information reflects total *Forest Plan* accomplishment relative to the long-term sustained yield capacity or the allowable sale quantity (FSM 2492.12). The Program Sale Statement for the Wenatchee NF is shown below.

Program Sale Statement

Fiscal Year	Chargeable (MBF)	Non-Chargeable (MBF)	Dead	Live
	Dead	Live		
1993	11,334.45	1,422.17	3,889.25	35.6
1994	6,044.34	7,820.47	2,389.53	181.2
1995	52,317.96	444.80	2,008.49	3.0
1996	62,512.39	12,783.70	6,152.15	13.8
1997	5,242.31	5,049.11	22,482.81	146.2
Total	137,461.45	27,520.25	36,922.23	379.8

Note: Chargeable volume is volume removed from land allocations that are part of the suitable timber base, and non-chargeable volume is volume removed from land allocations outside the suitable base.

The PSS volume for Fiscal Year 1997 went down; the largest reduction compared to the prior two years occurred in the chargeable dead. This reduction reflects the reduced amounts coming from the 1994 fires.

TIMBER OFFERED, HARVESTED, SILVICULTURAL ACTIVITIES

The direction in the *Forest Plan* states that the PSQ levels are estimates. They represent neither minimum levels that must be met, nor maximum levels that cannot be exceeded. They are rough approximations because of: (1) the difficulty associated with predicting actual timber sale levels over the next decade, (2) the when and where to offer timber sales, and (3) the complex nature of many of the land management agencies to develop new timber sales that conform with the planning amendments.

The PSQ on the Wenatchee NF is conforming to the direction addressed in the *Northwest Forest Plan*. The decade total is within 5 percent of the *Forest Plan* projections.

Fiscal Year	Timber Offered (MMBF)	Timber Harvested (MMBF)	% of PSQ
1993	16.8	58.4	-31
1994	12.0	32.5	-51
1995	98.8	19.9	+305*
1996	92.5	91.7	+279*
1997	50.4	56.4	+107
Average	54.1	51.8	+122

*Includes volume harvested from the 1994 fires.

Recommendations Include:

Continue to sell timber as directed in the *Forest Plan*.

Continue to monitor PSQ utilizing the STARS and PSS databases and compare volume to projected decade trend.

Monitoring Item-

TIMBER HARVEST UNITS (SIZE, SHAPE AND LOCATION)

The goal is to manage vegetation cover to meet direction on size of openings created by National Forest timber harvest. The monitoring question is:

Are the Forest Plan Standards and Guidelines regarding the size and dispersal of openings and condition of adjacent vegetation (e.g. height of trees in adjacent areas) being appropriately implemented?

Based on the PSQ the amount of clearcutting that has been identified is 484 acres per year. During Fiscal Year 1997, 56.4 MMBF was harvested from 5,496 acres. Almost all of the harvest acres (86.1 percent) were selection (sanitation/salvage) and most were from 1994 fire salvage or *Dry Site Strategy* thinning sales.

The Wenatchee NF is meeting its Plan Goals and Objectives. The decrease in harvested acres, along with the shape, size, and location has been accomplished to coincide with the new goals and objectives in the *Forest Plan*.

Recommendations Include:

Continue monitoring as scheduled.

Monitoring Item-**TIMBER HARVEST**

The goal is to ensure that regeneration harvests are not prescribed for areas where average annual growth has not generally reached culmination of mean annual increment. The monitoring questions are:

Are stands being harvested at an age and condition that produces the expected growth measured on an average annual cubic foot basis?

Is the amount of volume removed consistent with amounts sold?

In 1997, no acres were clearcut. Since 1993, the two issues that have been directing the timber harvest have been the *Northwest Forest Plan* and the salvage related to the 1994 fires. This has reduced the regeneration harvest acreage to near zero. The focus has been to harvest fire salvage (sanitation/selective tree removal) and thinning from below on overstocked stands, especially on the drier ecosystems within the Forest Matrix and associated Late-Successional Reserves.

Harvest volumes will decrease as fire salvage is completed; however, acres treated will remain high as harvest shifts towards thinning of small trees from large portions of the landscape with low volumes/acre being removed. In the next few years, the majority of the PSQ volume will come from *Dry Site Strategy* sales.

Stands being scheduled for regeneration are within 5 percent of the culmination of mean annual increment. Volume removed is within 15 percent of amount sold. Harvest is high due to the fire salvage and sell volume is less than offered due to some low value fire salvage sales not selling.

Fiscal Year	Timber Sold (MMBF)	Timber Harvested (MMBF)	% Difference
1993	20.2	58.4	+189
1994	16.1	32.5	+102
1995	54.5	19.9	-174
1996	80.5	91.7	+14
1997	30.7	56.4	+84
Average	40.4	51.8	+28

Recommendations Include:

Continue monitoring as scheduled.

Monitoring Item-**SILVICULTURAL PRACTICES**

The goal is to ensure that silvicultural prescriptions are appropriate, effective and consistent with resource objectives for each management area. The monitoring questions are:

How many acres of each planned silvicultural practices have been accomplished?

Have silvicultural prescriptions met objectives set for each management area?

Are managed stands growing at the rates estimated by Forest Plan yield models?

Activity	Acres
Release and Weeding	598
PCT	1,467
Pruning	0
Fertilization	46
Planted with Known Seed Source	10,256
Silvicultural Exams and Prescriptions	27,743
Site Prep. For Planting or Seeding	280
Animal Damage Control	679
Harvest- Clearcut	0
Harvest- Removal Cut (prep/seed/removal)	323
Harvest- Selective Cut (select/thin)	442
Harvest- Sanitation	4,731

The silvicultural prescriptions have been implemented to foster and promote the different type of land attributes in the *Forest Plan*. The different types of silvicultural prescriptions are meeting the objectives for each type of management area.

The current program is aimed at the salvage from the 1994 fires and reducing the overstocked stands in the dry forest ecosystem. The original intent of the *Forest Plan* was to establish plantations on lands that were allocated as General Forest. The use of improved growing stock and an aggressive tree improvement program were aimed at making sure the *Forest Plan* was implemented. To a lesser degree, the Wenatchee NF is continuing to utilize the TSI approach, but with a focus at treating landscapes instead of individual trees or stands. As a result of the *Dry Site Strategy* the Wenatchee NF is aiming prescriptions at reducing stocking levels so growth will be maintained on sites that already have maximum stand density index. The current silvicultural prescriptions are meeting the intent of the *Forest Plan* to insure that stands are growing at rates that are being estimated by yield models.

On October 3, 1997 the Wenatchee NF reviewed and approved the use of updated height-diameter relationship (equation and coefficients). This will influence the calculation of volume from the permanent plot grid inventory, and help improve the growth estimates generated from the *Forest Plan*.

Recommendations Include:

Continue monitoring as scheduled.

Monitoring Item-**REFORESTATION**

The goal is to minimize the amount of time between the removal of existing trees and reforestation with desired species. The monitoring questions are:

Is adequate tree stocking for each management area achieved within the time frame established with the desired silvicultural method?

Have adequate numbers of trees of desired species been established to realize optimum growth for management area?

The Wenatchee NF monitors reforestation by tracking the acres that are reforested every year. The tracking is accomplished by, and reported in, the Silva Database in TRACS, Table 22, *Status of Reforestation After Final Harvest*, and in the *Survival and Growth Report*.

Many of the acres reforested were not harvested. There is no direct relationship between acres reforested and acres harvested within the burn area. Some areas did not need to be reforested because of natural regeneration.

During Fiscal Year 1997, 16,226 acres were planted with tree seedlings, or were reforested naturally. Most of the acres were planted in stands that were burned.

Status of Reforestation After Final Harvest for Fiscal Year 1997 shows that 3,665 acres out of 3,770 acres harvested were adequately stocked (97 percent). *Survival and Growth Report* is based on field surveys conducted by RDs and field visits by the Resources Staff. The field visits indicated that the appropriate species and planting stock were being utilized on sites that required reforestation. First year survival for Fiscal Year 1997 was 87 percent and third year survival was 72 percent. The report shows that 94 percent of the acres reforested were determined satisfactorily stocked at the time of the third year exam; and, 92 percent of all acres certified in Fiscal Year 1997 met prescribed stocking objectives, with one treatment.

Recommendations Include:

Continue monitoring as scheduled.

Monitoring Item-**LANDS NOT SUITABLE FOR TIMBER MANAGEMENT**

The goal is to verify that technology and/or other information has not been developed to justify reclassifying lands from a "not suitable" status to "suited for timber management", or vice versa. The monitoring questions are:

Have the lands that were identified in the Forest Plan as not suitable for timber management now become suitable for timber management?

Is the suitable/not suitable land classification accurate as identified in the Forest Plan database?

Suitability is being monitored at the Ranger Districts by the silviculturist. There appear to be no problems with identifying acres that do not meet *Forest Plan* Standards and Guidelines. Any new changes are being updated in the GIS database.

Recommendations Include:

Continue to utilize the NEPA process to determine suitability of lands.

Continue to update the Wenatchee NF GIS layer that keeps track of suitability.

Continue to monitor the reforestation success on all lands that are harvested, especially on the drier, low elevation sites that tend to have more difficulty regenerating.

J. SOIL, WATER, FISHERIES AND RELATED WATERSHED MANAGEMENT

Monitoring Item-

MAINTENANCE OF LONG-TERM SOIL PRODUCTIVITY

The goal is to manage the soil resources by implementing management practices that maintain or enhance productive soil nutrient and water cycles. The monitoring question is:

Is soil productivity being protected?

Monitoring has focused on the evaluation of detrimental soil disturbance associated with ground disturbing activities, primarily timber harvest. Past monitoring has indicated that existing conditions on nearly all acres subject to ground based harvest entries exceeded *Forest Plan* Standards for detrimental soil disturbance.

During the 1997 field season, soil disturbance monitoring was conducted on five sale units pre and post harvest, but prior to soil rehabilitation treatments.

Pre-harvest monitoring results indicated that essentially none of the areas met *Forest Plan* Standards. These areas have had prior harvest entries that have altered natural surface soil layers and caused detrimental soil disturbance, primarily compaction. Post-harvest results from two units on the Leavenworth RD were subject to variability introduced by the need to establish a new set of transects and interpretation differences between two different sampling crews. In those two cases, both of which were skyline harvested, post-activity disturbance levels were less than the pre-activity disturbance levels. So while the results did not indicate that Standards were exceeded, the high variability makes it difficult to detect changes due to the activity. Post-activity results from the two ground-base yarded units on the Entiat RD (processor/forwarder or skidder) indicated that one unit met, and one unit exceeded, detrimental disturbance levels identified in the project Decision Notices. Both units are scheduled for additional field review in 1998 due to the higher than expected disturbance levels.

Post-activity results from the unit in which the walking excavator was used for brush disposal, indicated that the equipment contributed to a soil disturbance level that exceeded Standards. Guidelines for that equipment were identified for situations and details of use that would not cause unacceptable levels of soil disturbance.

The Wenatchee Ground Based Harvest Policy, approved in June 1996, has established an analysis and monitoring framework for the planning and implementation of ground disturbing activities. As part of that policy a number of different yarding methods and soil rehabilitation practices were applied and evaluated in 1997. The Wenatchee NF sponsored a 3 day workshop in June 1997 focused on evaluation of ground based harvest methods and soil rehabilitation techniques including the self-drafting winged sub-soiler. The sub-soiler, purchased in 1996, has been used to reduce soil compaction on the several projects on the Entiat RD and is available for use on the Wenatchee and Okanogan National Forests. This device represents the state-of-the-art in mechanical treatment of heavily compacted areas such as skidtrails and temporary roads. For more information see *1996 Soil Monitoring Report-Entiat Ranger District* and *1997 Soil Monitoring Report-Entiat Ranger District*.

Other results include a finding that a simple penetrometer may give comparable results to the standard core sampling method for determining compaction. The penetrometer can give immediate results for much less cost allowing real-time modification of operations. For more information see *1997 Soil Monitoring Report-Entiat Ranger District* and *1997 Soil Disturbance Monitoring, Leavenworth and Lake Wenatchee Ranger Districts*.

Recommendations Include:

Further Evaluation.

Continue full implementation and refinement of the Wenatchee Ground Based Harvest Policy.

Continue qualitative and quantitative monitoring of selected sale units, with emphasis on evaluation of non-traditional yarding methods and soil restoration techniques. Monitor the effectiveness of the sub-soiler rehabilitation work on skidtrails and landings that were treated in 1996 and 1997. Conduct field review of past harvest activities to determine any unit layout or operation improvements that could have been made to reduce additional disturbance.

Continue to evaluate monitoring techniques that improve consistency and provide a less costly alternative to traditional core sampling methods.

Continue to reduce the variability in the monitoring methodology by finding better ways to identify transect locations, and reviewing field procedures for identifying disturbance classes, especially detrimental displacement and erosion.

Continue to conduct Wenatchee NF level workshops on soil resource management, with emphasis on rehabilitation techniques. Continue to promote Forest-wide use of self-drafting winged sub-soiler to treat compaction in select areas such as roads, landing and areas of concentrated use.

Given the extent of past soil disturbance on sites that have had previous harvests, rehabilitation treatments need to be evaluated and/or developed. Monitor the effectiveness of the subsoiler rehabilitation work on skidtrails and landings that were treated in 1996 and 1997.

Monitoring Item -

FISH/RIPARIAN STANDARD AND GUIDELINE IMPLEMENTATION

Are Standards, Guidelines and Related BMPs for fish habitat and riparian areas as defined in the Forest Plan being applied in the design and execution of timber sales, watershed restoration, and other projects where fish/riparian Standards are a concern?

In 1997 one focus of implementation monitoring was the evaluation of the *Jobs in the Woods* (JITW) watershed restoration projects. The four projects that received interdisciplinary review were rehabilitation/closure of dispersed recreation sites in the Box Canyon watershed, resurfacing of a road in Box Canyon watershed, riparian meadow rehabilitation in the Taneum watershed, and dispersed recreation site improvement in the Little Naches.

The projects addressed watershed restoration problems that were identified through watershed analyses, and all the projects received interagency review and discussion. Two of the projects (Box Canyon dispersed sites and road resurfacing) appear to have effectively addressed the needs and appear to be working well. Suggestions to make the dispersed site rehabilitation/closure projects even more effective involved ways to keep the closed sites closed, and ways of making the new sites easier to use. At least one follow-up project, signing to explain the restoration efforts, is underway.

In two of the projects the evaluation team felt that some underlying needs identified in watershed analysis were not addressed. The riparian meadow rehabilitation project did a good job of eliminating vehicle use in the meadow, but did not deal with the issues of hydrologic function and streambank stability. The Little Naches dispersed site improvement project half of the project appeared to be working as planned, the other half needs a better integration of recreation and riparian objectives. For example, it was unclear where future dispersed recreation should be encouraged and where it should be avoided, nor was it clear how channel lateral migration was addressed. In all projects follow-up activities were suggested to increase or maintain the effectiveness of the watershed restoration work.

Other watershed restoration projects monitored included additional rehabilitation work on dispersed recreation sites in the Little Naches drainages, rehabilitation work on campground riparian zones in the Kachess and American drainages, road related watershed improvement projects in the Entiat, Manastash, Taneum and Little Naches drainages, side channel restoration in the Little Naches and Naches drainages, and noxious weed control in the Entiat drainage. Most projects were functioning as designed with almost all of the rest at least partially functioning as planned. Problems identified that were slowing progress in some projects included intensive elk grazing of revegetated areas, continued human use of closed revegetated areas, and loss of woody debris in the channel to campfire use despite signs explaining why it should be left in the stream channel. In the case of a road bank revegetation project an experiment was devised and is currently underway to develop a more reliable way to revegetate these tough sites.

Recommendations Include:

Further Evaluation.

It is recommended that implementation monitoring at some level be conducted and reported annually which is a continuation of the recommendation of past years as well. The implementation monitoring in 1997 was very useful.

Monitoring Item -

EFFECTIVENESS OF RIPARIAN STANDARDS AND GUIDELINES

Are Standards and Guidelines that describe Desired Future Conditions for specific riparian areas/fish habitat being met?

Measurable Standards for aquatic and riparian habitat structure and function were established in the 1990 *Forest Plan*. The Standards are to be used as a method to measure attainment of *Forest Plan* Goals and Objectives for aquatic and riparian habitat. With the adoption of the *Northwest Forest Plan* these same Standards could be viewed as a method of measuring attainment of the Aquatic Conservation Strategy.

The Wenatchee National *Forest Plan* Standards and Guidelines for stream structure and function are as follows: For large woody debris the Standard for fish-bearing streams is to have a minimum of 100 pieces per mile of stream with at least 20% of those being \geq 50 feet in length and \geq 20 inches in diameter. The small size woody debris needs to be \geq 50 feet in length and \geq 12 inches in diameter. The Pool Standards are as follows:

For fish-bearing streams with a gradient less than three percent, one primary pool per six bankfull channel widths; in fish-bearing streams with a gradient \geq three percent one primary pool per three bankfull channel widths. A primary pool occupies \geq 50 percent of the low flow channel width and has a maximum low flow depth of \geq three feet. In non fish-bearing, class III streams there is no depth requirement for the pools and in class IV streams there is no numeric pool standard.

Fine Sediment Standards call for \leq 20% fine sediment \leq 1.0mm in diameter in spawning gravels in Forest streams.

The water temperature standard for class I, class II and fish-bearing class III streams calls for a maximum daily temperature \leq 61 F and an average 7-day maximum \leq 58 F.

The Wenatchee NF has annually implemented a stream survey, sediment and water temperature monitoring program. The following summarizes the results of the three programs.

Stream Surveys

Between 1989 and 1997, the Wenatchee NF completed stream surveys using the standard Region 6 stream survey protocol on over 1,300 miles of stream; this information is used to determine if individual stream reaches are meeting Standards for pools and in-channel large woody debris. The following is a summary of the compliance of the streams surveyed in 1997 with the *Forest Plan* Standards and Guides (wood and pools only).

Large Wood: None of the stream miles surveyed met the Standard.

Pools: Five percent of the stream miles surveyed in 1997 met the pool standard when the 3 foot depth requirement was considered. Removing the depth requirement did not change the results.

The current Wenatchee NF Standards for stream channel conditions represent a “one-size-fits-all” minimum threshold. The Standards are generally applied at a stream reach level. Using the stream inventory data the Wenatchee NF has been reevaluating these “threshold” standards to determine if single-value thresholds can be replaced with descriptions of potential natural variability in stream habitat, and understanding the processes “driving” habitat conditions in watersheds. The use of threshold standards has been questioned in scientific literature. Watersheds and stream channel conditions are dynamic. Habitat descriptions need to be used in the context of the conditions within the watershed, and how habitat is affected by disturbance processes. Additionally, even if an absolute threshold could be identified, below which the aquatic system is not functioning properly, by the time a threshold is reached most damage to watershed and stream processes has probably occurred.

The Wenatchee NF is examining the stream inventory data, primarily large wood and pools, to determine current and desired conditions for Wenatchee NF watersheds (see *Desired Stream Condition Project Report, WNF 1998*). Results indicate that variability in mean levels of large wood can be reduced by about 39 percent if the data are stratified by subsection, riparian vegetation, subwatershed precipitation, and Rosgen channel class. Subsection, valley width and Rosgen channel classification account for about 36 percent of the variation in pool areas. To describe what "natural" stream conditions may look like or how past management may have influenced stream habitat the data were analyzed by road density (as a surrogate for human disturbance). Road density appears to account for significant but small differences in mean pool area and mean large wood frequency.

One possible approach the Wenatchee NF is exploring is to move away from threshold standards alone to using a range of conditions one would expect to observe in properly functioning watersheds. These ranges of conditions could then be used as a diagnostic of habitat conditions within different types of watersheds. More complete findings of this approach are included in the *Desired Stream Condition Project Report* cited above.

In addition to the aquatic habitat surveys, the Wenatchee NF surveyed stream cross sections on 123 sites in undisturbed portions of 13 watersheds (spanning five subsections) using hydrologic survey protocols. These hydrologic surveys are being analyzed as part of a graduate research project; the goal is to describe the stream channel and its variability and identify the factors affecting that variability in unmanaged streams on the Wenatchee NF. The data analysis is continuing with completion expected in 1998. This work will give a baseline with which to compare managed streams in the future and allow better monitoring of managed watersheds as measured through changes in the stream channel. These hydrologic surveys are being incorporated into watershed analyses and the surveys are linked to a riparian disturbance ecology study by the Wenatchee Forestry Sciences Laboratory.

Disturbance Analysis

One of the goals of the 1997 monitoring program was to continue to document the effects of the 1995/1996 floods on several additional streams on the Wenatchee NF (a continuation of the 1996 work). Data from three types of surveys were integrated in the analysis (*Desired Stream Condition Report*). Seven streams with pre- and post-data for a flood of record were compared along with one stream with pre- and post-data from a major fire.

Each type of survey confirmed the trends indicated by the other survey types. Integrating the data provided a much more comprehensive assessment of the survey area. The surveys complement, but do not duplicate each other: each survey type provides unique insights.

Results indicated that low gradient, properly functioning reaches in the Wenatchee Highlands are laterally mobile, actively migrating across a broad floodplain, with average migration of 6 feet after a flood, and long-term average annual migration of 2 to 6 feet. Although these streams are migrating, stream channel cross-sectional area remained the same. Three out of five streams aggraded although the median amount of aggradation per transect was near zero. Wood is a very important factor influencing the thalweg, pool formation and channel migration. Large wood and habitat were fairly stable on a reach basis. When these results were compared to similar reaches in Nason Creek, located in the same subsection, channel geometry, large wood and habitat characteristics indicated that Nason Creek has been greatly influenced by human activity (e.g. highways, railroads). Large woody debris (LWD) and pools did not remain stable in Nason following flooding; the direction and magnitude of the responses varied between flood events and channel reaches, but ranged beyond 50 percent loss or gain of LWD per mile and pools.

Two streams in the Upper Yakima Swauk Subsection (Stafford Creek and Middle Fork Teanaway) were also characterized. In contrast to the streams in the Wenatchee Highlands, degradation (downcutting) was noted although lateral channel migration also occurred. Bedrock outcrops have more of an influence on pool formation than wood. Woody debris shifted or was lost from the system. Pool area generally decreased. Shallow pools, which tended to be formed by wood, were lost while the deeper pools, which were formed by bedrock were stable.

One stream in the Naches Mountain Subsection was also characterized. This stream has been greatly influenced by human activity. Like the streams in the Swauk Subsection, this stream both laterally migrated and degraded. In most reaches LWD fluctuated, going up over the first flood and decreasing over the second, while pool areas changes were uncertain. In one reach LWD and pool area experienced large changes in tandem during different flood periods.

Functioning floodplain width was a diagnostic feature affecting channel properties and behavior, and a key linkage between subsection features and channel condition and dynamics. In most cases, systems with wide functioning floodplains have high sinuosity, which appears to be an important determinant of channel lateral migration. In addition entrenched (very narrow to no floodplain) systems degraded while unentrenched systems aggraded.

The strength of this study lies in the integration of the different survey types. Only through integration of all of the surveys could we characterize Chiwawa as a healthy system, dynamic yet stable, and Nason as at-risk, with altered channel condition and response resulting in unstable habitat conditions.

High Lakes Surveys

Four lakes were sampled on the Wenatchee NF during 1997. The purpose of the surveys was to describe the physical, chemical and biological characteristics of the lake-water and also to describe the habitat of, and human impacts to, the lake shore.

Overall the water quality sampling showed no specific areas of concern. However at two lakes, Moonshine and Michael Lakes, Cle Elum RD, there was heavy use of the riparian area. Several of the camps were horse camps and with manure in the water and at the waters edge it was apparent that these campsites were too close to the lake.

Macroinvertebrate Sampling

Sampling was carried out to gather baseline data on Chikamin Creek in the Chiwawa River watershed before any mining activity begins. The macroinvertebrate results indicated that the stream was in good condition. See *Aquatic Ecosystem Inventory, Macroinvertebrate Analysis, Lake Wenatchee RD, Chikamin Creek, 1997*.

Recommendations Include:

Further Evaluation. The following recommendations are continuations of the 1996 recommendations.

Continue the integrated hydrologic surveys using the Region 6 stream survey protocol and the hydrologic cross sections to better describe and monitor riparian/channel conditions and aid in developing linkages to upslope processes. This will be an important linkage for watershed analysis. Continue the high lakes surveys. Coordinate the surveys with wilderness personnel. The information is useful not only for local management concerns but also is helpful as a baseline to measure regional air quality changes.

Fine Sediment

Monitoring fine sediment levels in spawning gravels began with a few streams in 1990 and has increased to 84 sampled reaches, although some reaches were sampled only once. Most monitoring occurred in the Yakima River Basin with efforts expanding to the Wenatchee and Entiat subbasins in recent years. There has been no sediment monitoring in the upper Yakima subbasin since 1995. The monitoring has shown that there are a number of streams on the Wenatchee NF currently exceeding the *Forest Plan* Fine Sediment Standard but the situation in 1997 was one of a general downward trend in fine sediment levels across the Wenatchee NF with a decrease in fine sediment level in five reaches, no appreciable change in 14 reaches and an increase in only one reach (Pyramid Creek in the Little Naches). A yellow light condition definition (fines from 15 to 20 percent) has been adapted from the Resource Manage-

ment Committee on the Upper Yakima subbasin. Reaches of the Mad River, Entiat River, Chiwawa River, Devils Gulch (Mission Creek tributary), and Little Naches and its tributaries, had fines in this yellow light zone. In 1997 only two sampled stream reaches had a mean level of fine sediment greater than the 20 percent cutoff (Sand Creek and Chiwawa River). Two steam reaches in unmanaged watersheds were sampled in 1997 expanding our knowledge of what "baseline" fine sediment levels might be. 1997 saw the third year with good spring flushing flows from above average snowpacks; this combined with road related watershed improvements, particularly in the Little Naches watershed, may be a large factor behind the general improvement in fines in many watersheds. See *1997 Sediment Monitoring Report, Chiwawa River, Chikamin Creek, Mission Creek, Devils Gulch, Sand Creek, Lake Wenatchee-Leavenworth Ranger Districts* and *1997 Sediment Monitoring Report, Entiat River, Mad River, Entiat Ranger District* for more information.

Little information is available from "baseline" streams so it is difficult to determine how trends in fine sediment are related to natural processes or human disturbance. Generally, the highest fine sediment levels have been found in streams which flow within landforms that would be expected to produce fine sediment. The lowest fine sediment levels have been observed in stream reaches least impacted by ground disturbing activities. Monitoring shows that existing fine sediment levels are a concern in some stream reaches and are exceeding the Wenatchee NF standard in others. Activities which will tend to increase fine sediment deposition in these streams would not be consistent with the Aquatic Conservation Strategy, especially in Key Watersheds, unless concurrent restoration occurs which would be expected to reduce overall sediment delivery to the system. In fact much of the watershed restoration completed to date has been in these "problem" watersheds. Stream reaches exceeding Standards in past years are found in the mainstem Entiat; Kahler Creek, the lower White River (glacial flour may be a factor), Chiwawa River, Peshastin Creek, Tronsen Creek, and Mission Creek in the Wenatchee Subbasin; Cabin Creek, Little Creek, West Fork Teanaway, North Fork Manastash, South Fork Manastash, Taneum and North Fork Taneum in the Upper Yakima Subbasin; and Pyramid Creek in the Naches Subbasin.

Recommendations

Further Evaluation. The following are continuations of the 1996 recommendations.

Continue to investigate differences in fine sediment amounts and trends in managed and relatively unmanaged watersheds of different landtypes. This is coordinated with the Yakama Indian Nation.

Focus watershed restoration on watersheds (especially within key watersheds) containing Candidate, Threatened or Endangered aquatic species and, where fine sediment exceeds the Standards or are above a 15 percent "yellow light" with increasing trends.

Continue monitoring and expand monitoring network. Possibly after a 5 year trend is established monitor some reaches in alternate years so more streams can be sampled with the present level of effort. In 1997 this expansion into relatively unmanaged watersheds occurred.

Stream Temperature

The Wenatchee NF has been monitoring stream temperatures since 1990. The following is a summary of the recorded thermograph data.

Year	# streams exceeding standard/# streams	# stream days exceed daily max	# stream days exceed ave 7 day max	# stream sampled
1990	3/3 (100%)	36	64	445
1991	9/12 (75%)	153	318	2065
1992	10/11 (91%)	351	478	3492
1993	13/17 (76%)	264	472	1863
1994	24/26 (92%)	1192	1872	4382
1995	30/57 (53%)	540	1143	5470
1996	35/45 (78%)	703	1108	3317
1997	31/74 (41%)	671	1314	5399

Stream temperatures are influenced by flow and air temperatures. In addition in many cases different streams have been measured in different years further complicating a picture of trend. Snowpack levels were above average during the Winter of 1996/97 resulting in good streamflows in 1997 which helped to keep stream temperatures low. In fact, 1997 had the lowest percentage (41 percent) of monitored streams that did not meet Standards.

A number of streams, especially mainstem tributaries exceed temperature Standards for some period during the summer. Based on the 1997 data, the most severe temperature problems on the Wenatchee NF occur in: the Bumping River, Little Rattlesnake Creek, Little Naches River, and Nile Creek on the Naches RD; Swauk Creek, Middle and West Fork Teanaway, Taneum Creek, Waptus River, Cooper River on the Cle Elum RD; Mission Creek, Peshastin Creek, Icicle Creek on the Leavenworth RD; Nason Creek on Lake Wenatchee RD; Mad River, Entiat River, Hornet Creek, Mud Creek, and Stormy Creek on the Entiat RD.

For more information on 1997 results see *1997 Stream Temperature Monitoring Report, Entiat and Chelan Ranger Districts* and *1997 Temperature Monitoring, Leavenworth and Lake Wenatchee Ranger Districts*.

A project is currently underway to model stream temperatures on Wenatchee NF and link the results to streams on the entire east side of the Cascades in Washington. The results should help us determine which streams have temperatures that are affected by management activities in the watershed. This project is being conducted in cooperation with the Environmental Protection Agency.

Recommendations Include:

Further Evaluation. The following recommendation is a continuation of the 1996 recommendation.

Continue the project to model stream temperatures. This should help identify which streams have had temperature regimes modified by management activities, and the extent of that modification. Initial results may be available in 1998. It may also lead to providing a basis to change some Standards.

Monitoring Item -

FISH MANAGEMENT INDICATOR SPECIES (MIS) POPULATIONS

Are viable populations of Management Indicator Species (MIS) being maintained?

Fish chosen to be MIS on the Wenatchee NF are anadromous salmonids, bull trout, and cutthroat trout. Portions of five subbasins lie within the boundaries of the Wenatchee NF; the Naches and Upper Yakima within the Yakima River Basin, the Wenatchee, Entiat and Chelan. Anadromous fish are native to all but the Chelan. Spring chinook salmon and steelhead trout are found in the Naches and Upper Yakima; spring and summer chinook, sockeye salmon and steelhead are found in the Wenatchee; and spring and summer chinook, some sockeye salmon and steelhead inhabit the Entiat. The Wenatchee NF has not been actively monitoring anadromous fish returns due to established monitoring programs at mainstem Columbia River dams; Yakama Indian Nation spawning surveys in the Yakima River Basin; and Chelan County PUD spawning surveys in the Wenatchee and Entiat Rivers.

Spring Chinook Salmon

All spring chinook stocks on the Wenatchee NF are considered to be depressed, and returns to the Entiat and Wenatchee systems in the last 3 years have been some of the lowest on record.

Yakima River Spring Chinook Redd Counts 1990-1997

	1990	1991	1992	1993	1994	1995	1996	1997
Naches Subbasin	464	460	425	554	272	104	184	339
Upper Yakima Subbasin	773	630	1,246	656	290	117	814	420

(Data provided by Lee Carlson, Yakama Indian Nation

Spring Chinook Redd Surveys Wenatchee and Entiat Subbasins 1990-1997

	1990	1991	1992	1993	1994	1995	1996	1997
Wenatchee Subbasin	446	251	491	536	125	23	73	176
Entiat Subbasin	83	32	42	100	24	1	8	20

(Entiat Subbasin data from Table 1 in "Spring and Summer Chinook salmon and Sockeye Salmon Spawning Ground Surveys on the Entiat River, 1996. U.S. Fish and Wildlife Service, Mid-Columbia Fisheries Resource Office. Leavenworth Wa. David Carie, author and 1997 data are from D.Carie.)

Wenatchee Subbasin Data from "Spring and Summer Chinook Spawning Ground Surveys on the Wenatchee River Basin, 1996. Chelan County PUD. Wenatchee, Wa. Peven and Mosey authors; and "Status of Spring Chinook Salmon in the Mid-Columbia Region 1995". Chapman and others. Don Chapman Consultants, Inc. Boise Idaho and 1997 data are from T.R.Mosey, Chelan Co. PUD. Data include redd counts less Icicle River counts.

As evident from the above information, the status of spring chinook within the subbasins is disturbing, to the point that the continued existence of the runs other than the hatchery stocks is a concern. The status of the Wenatchee and Entiat stocks appears critical. There is some information that over the last several years, spawner to recruitment ratios have been below that necessary to perpetuate the runs (*Larry LaVoy, Washington Department of Fish and Wildlife, personnel communication*). The cause of the recent slide is not known but diminishing returns within other portions in the Columbia Basin point to possible changes in mainstem and/or ocean conditions, as well as any factors affecting the runs in their natal subbasins. Given their status care needs to be taken to make sure that no management action has a negative impact on chinook habitat, in particular fine sediment, temperature and habitat complexity. Bull trout, found more in stream headwaters, are not following this same declining trend.

Summer Chinook Salmon

Naturally spawning summer chinook salmon are found in the Entiat and Wenatchee subbasins. Summer chinook are extinct in the Yakima River Basin and the historical range probably never extended onto the Wenatchee NF. It has been suggested that summer chinook may not have been native to the Entiat River system but that the existing run may be an artifact of past hatchery outplants as part of the Grand Coulee Fish Maintenance Project. Regardless, they are part of the Upper Columbia summer/fall chinook population. Summer chinook returns to the Entiat have been sporadic since redd surveys have been conducted beginning in 1957, ranging from 0 redds counted to 55, with an average count of 13 during the period of 1957 to 1991. No formal redd surveys were conducted after 1991 until 1995 when personnel from the U.S. Fish and Wildlife Service Mid-Columbia Fisheries Resource Office in Leavenworth, Washington conducted redd surveys. A total 46 redds were observed in 1995, with 45 redds observed in 1996 and 30 redds in 1997. While no formal redd surveys were conducted between 1992 and 1994, summer chinook were observed spawning in the Entiat during those years.

Summer chinook returns in the Wenatchee the last 2 years are at their lowest level of the decade. An interesting trend with summer chinook is an increase in the numbers of fish spawning in the Leavenworth area and upstream.

Wenatchee River Summer Chinook Redd Surveys 1990-1997

	1990	1991	1993	1994	1995	1996	1997
Redd Count	2,479	2,180	2,334	2,426	1,872	1,435	1,388

(Data from Appendix A4 in Peven, Charles and T.R. Mosey. Spring and summer chinook spawning ground surveys on the Wenatchee River Basin, 1996. Chelan County Public Utility District. Wenatchee, Wa. December 1996. 1997 data are from T.R.Mosey, Chelan Co PUD.

Sockeye Salmon

The Wenatchee River supports one of the last two sockeye salmon populations in the Columbia River. Annual returns to the Wenatchee can be highly variable, possibly reflecting ocean conditions. Sockeye salmon returns to the Wenatchee River averages about 30,000 adults. In 1993 the adult return was about 37,000 fish while in 1994 the return was down to a little over 9,000 (*Larry LaVoy Washington Department of Fish and Wildlife*, personnel communication). The 1995 return was worse than 1994. Using numbers from the Fish Passage Center and subtracting sockeye counts over Rock Island Dam from Rocky Reach only 4,476 adult sockeye would be estimated to have escaped to the Wenatchee system. In 1996 numbers improved somewhat to 7,566 still substantially below average. In 1997 numbers improved again to 11,064 approximately half of the 10-year average. Ocean conditions are thought to be a major factor in the observed sockeye population fluctuations, although some of the decline through 1995 could have been due to effects of the 1990 flood.

Summer Steelhead

Summer steelhead populations on the Wenatchee NF are a mix of naturally spawning and hatchery fish. All stocks on the Wenatchee NF are considered to be depressed and low numbers of naturally produced returning adults is a concern. The returns to the Wenatchee drainage are displayed below.

Wenatchee River Summer Steelhead Escapement, Return Years 1990/91-1996/97

Return Year	90/91	91/92	92/93	93/94	94/95	95/96	96/97
Hatchery	1,174	2,037	3,722	1,381	2,065	1,710	1,037
Wild	608	937	816	517	625	698	492
Total	1,782	2,974	4,538	1,892	2,690	2,408	1,529

Data provided by Larry LaVoy and Larry Brown, Washington Department of Fish and Wildlife.

Yakima River Summer Steelhead Escapement, Return Years 1990-1997

Return Year	90	91	92	93	94	95	96	97
Hatchery	87	104	251	80	14	98	72	130
Wild	727	730	2,014	1,104	540	820	665	772
Total	814	834	2,265	1,184	554	918	737	902

Data provided by Bruce Watson, Yakama Indian Nation.

What little information exists on steelhead returns to the Entiat system suggests that numbers are low. In 1997 8 steelhead redds were found along 3 miles of the Mad River a tributary to the Entiat (D.Carie USFWS Mid-Columbia/FRO).

Bull Trout

Bull trout are considered a Candidate species by the U.S. Fish and Wildlife Service with a decision due in 1998 as to whether they will be formally listed. Bull trout are found in all subbasins on the Wenatchee NF except the Chelan. Historically, bull trout did inhabit the Chelan subbasin but are now thought to be extinct.

The Wenatchee NF, the Washington Department of Fish and Wildlife and the U.S. Fish and Wildlife Service are cooperatively monitoring bull trout. Redd surveys using a standardized protocol have been conducted annually on nine "index" streams or reaches of streams since 1989. A tenth stream was added in 1993. The monitoring focuses on migratory populations, either fluvial (adults ascend a tributary stream from a larger stream for spawning, the juveniles rear initially in the tributary before returning to the larger stream) or adfluvial (adults migrate from a lake to tributary streams to spawn).

The 1997 total count is the second highest on record with the 1995 count being the highest.

Total Bull Trout Redds on the Wenatchee National Forest

Forest-wide trends are not as meaningful as population changes observed in individual populations. With the short time-frame in which monitoring has taken place there are no clear trends in the populations other than in one stream; Indian Creek in the Tieton River drainage definitely displays an upward trend. The other streams display annual fluctuations in returning adults. However, in 1997 all but two of the streams are above their 1989-1997 average redd counts. In addition all the streams (with the exception of three streams in the Wenatchee drainage-Chikamin Creek, Phelps Creek, and Panther Creek) are currently at or above the 75th percentile of their distributions.

Isolation and low numbers are potential problems facing bull trout populations on the Wenatchee NF. Only in the upper Wenatchee River, including the Chiwawa River system does there appear to be somewhat strong local populations that are "connected" to each other. These local populations are probably part of a larger metapopulation that may include Lake Wenatchee and possibly the upper Wenatchee River. Migrating bull trout have been documented in the Chelan County PUD weir near the confluence of the Chiwawa with the Wenatchee River, suggesting bull trout are migrating up the Chiwawa from the mainstem Wenatchee and/or Lake Wenatchee.

The status of bull trout in the Entiat system is unclear but it may be tenuous. There is only one tributary stream with a known spawning population. Bull trout have been observed spawning in the mainstem Entiat but the status of the mainstem spawning population is not known.

The greatest concern for the continued existence of bull trout is in the Keechelus and Kachess Lakes. These populations are isolated above dams with only one known spawning stream, and in the case of Kachess the numbers of spawners in any year is extremely low. Bull trout in the Tieton system, above Rimrock Lake and in the Bumping above Bumping Lake are also isolated, but the Bumping population appears to be larger than in Kachess and Keechelus and in Rimrock Lake there are at least two spawning streams with relatively strong populations.

Westslope Cutthroat

Other than distribution information, the Wenatchee NF has no empirical information on westslope cutthroat trout populations. Westslope cutthroat are widely distributed on the Wenatchee NF and many populations appear strong. In fact, the current distribution of westslope cutthroat may be greater than the historical due to stocking. One question with the cutthroat populations is the degree that genetic introgression has occurred as the result of a long history of stocking exotic rainbow trout. Recent work being completed by the U.S. Fish and Wildlife Service may shed light on this question. Special management may need to be considered for areas found to have pure westslope in order to maintain the evolutionary legacy of the species.

Recommendations Include:

Further Evaluation. The following are continuations of the 1996 recommendations.

The status of spring chinook salmon appears very precarious. It is suggested that even though spring chinook are not yet formally listed under the Endangered Species Act that we begin to manage as such. Watershed restoration should concentrate in watersheds that are important to bull trout and steelhead, as well as in those that are important to spring chinook.

Continue monitoring all bull trout index streams. Establishing long-term trends will assist with assessing the status of the local populations and provide an index of conditions within the larger system affecting the metapopulation. This information may indirectly be useful in interpreting trends in other populations. Spawning surveys on the index streams are planned to be completed annually.

Continue to better define native salmonid distribution and status on the Wenatchee NF. Streams to monitor will be determined at the annual monitoring meeting in coordination with the Yakama Indian Nation.

The conservation of bull trout needs to be a high priority in the Mad, Chiwawa, Deep Creek, South Fork Tieton and Indian Creeks as these are important core habitats. Conservation and active restoration need to be priorities in the Box Canyon and Gold Creek watersheds, as bull trout populations in these watersheds may be particularly "at risk".

Work with Fish and Wildlife Service to better define genetic characteristics of westslope cutthroat trout and redband trout on the Wenatchee NF. Watersheds with “essentially pure” populations should be managed to reduce the risk of exotic introduction and conserve habitat for those populations.

Complete the conservation strategy for native salmonid populations within each subbasin including the location of key subwatersheds within both the key and “non-key” watersheds.

Continue to better define aquatic communities on the Wenatchee NF, especially the distribution and, if possible, the status of non-salmonid fish and aquatic mollusks and brook lamprey.

Monitoring Item -

AQUATIC HABITAT OBJECTIVES

The monitoring question is:

Are stream and habitat improvement projects meeting Aquatic habitat objectives as stated in the Forest Plan, Policy Implementation Guide (PIG), and Salmon Summit?

Fish habitat improvement projects traditionally include placement of large wood or boulder structures to create habitat elements felt to be in short supply, fish passage around man-made or natural barriers, and creation of off-channel habitat to compensate for lost side channel habitat.

The Wenatchee NF has been changing its philosophy towards habitat improvement projects. In the past projects were generally based on site or reach specific assessments which did not necessarily reflect priority needs of the watershed as a whole. The focus on future projects should be on restoring the natural watershed and channel processes to provide as naturally functioning watershed as is possible. While in-channel projects may still be implemented to create important habitat conditions in the near-term or to assist in the recovery process, most projects should address conditions that are leading to degradation or causing a change in the natural delivery of water, sediment and organic material to stream channels.

Land systems inventory, completed for the Wenatchee NF, should help identify important watershed processes; from this mapping the dominant delivery mechanisms for water, sediment and organic material to channels can be identified. Improvement projects can then be designed to return the system to conditions more like those expected under the natural disturbance regime. Watershed analysis will help identify the current conditions and, given other ecological and management objectives, identify a desired condition. Improvement projects should then be based on attaining the desired ecological conditions.

It is important to look at past improvement projects to determine if they met project objectives, so this information can benefit future project work. Past projects have been monitored in two ways. The first is a cursory overview of projects asking the question; are improvements in place and do they appear to be meeting habitat/watershed objectives? This approach is a type of implementation monitoring. The second approach has been a form of effectiveness monitoring; not only are the projects creating the desired habitat conditions, but are the fish or other resource of interest responding as expected?

A level I structure monitoring survey was conducted on four streams on the Wenatchee NF. A level I survey simply determines the presence, movement, or loss of a structure. In Rock Creek in the Chiwawa watershed, 80 percent of the structures in the confined stream channel section of the project were meeting objectives while only 50 percent of the structures in the wider portion of the project area were meeting objectives. In the Mission Creek watershed while most of the projects are still functioning to control downcutting many of the pools have filled in with sediment. Those that are still working are those that used wood greater than 20 inches in diameter, were designed as upstream "V" structures, or were boulder clusters that work together. In the Little Wenatchee 50 percent of the structures that have gone through a spring runoff are still partially meeting objectives. Using a finer scale channel typing, wood and pool amounts are not as low as first thought in the reach where the wood structures were placed, and that the stream reach is a transport section of the river with little tendency to retain wood. In the case of Nason Creek most of the structures are still functioning but they may shifted and become part of a structure further downstream.

Past passage improvements appear to have been effective. Salmon Falls fishway provided passage around Salmon Falls on the Little Naches River, to what is believed to be historical salmon habitat. Salmon have been observed above the Falls. The Naches RD also monitored a number of culverts where improvements were made to allow resident trout passage. The treatments were found to be effective.

The effectiveness of past instream projects actually increasing fish production is difficult to assess for a number of reasons. First, unless limiting factors within the watershed have been carefully assessed it is not known if the production "bottleneck" has been addressed. Most past projects have also treated fairly small areas. Attempts have been made to assess the effectiveness of projects on Mission Creek, Leavenworth RD, Nason Creek on the Lake Wenatchee RD and the off-channel projects on the Naches RD. The Mission Creek and Nason Creek projects appear to have been effective in that fish seem to have responded positively to structure placement. See *Nason Creek, 1996 Level III Monitoring Report, Lake Wenatchee Ranger District* for more information on the Nason Creek Project. Juvenile chinook and rainbow/steelhead as well as other fish species rapidly colonized the created

off-channel habitat. These projects have not been evaluated on a watershed basis though, so all that can be said is fish appear to have responded positively.

Recommendations Include:

Continue Monitoring. The following are continuations of the 1996 recommendations.

Continue to monitor the longevity of the projects. This will be important to design of future watershed restoration projects.

Monitoring should focus on evaluating watershed restoration projects.

Monitoring Item -**AQUATIC ECOSYSTEMS**

Is the ecological health of the aquatic ecosystems recovering or sufficiently maintained to support stable and well-distributed populations of fish species and stocks?

This monitoring question incorporates elements of the preceding monitoring questions. The monitoring program since 1989 has been an attempt to answer this question. As monitoring and evaluation continues the status of aquatic ecosystems may become clearer. Clearly, wild stocks of spring chinook and summer steelhead on the Wenatchee NF are not faring well. This could be an indicator of problems with freshwater habitat; but, bull trout inhabiting the same watersheds are not showing the same declines. Factors off the Wenatchee NF are likely responsible for much of the observed decline in the spring chinook and summer steelhead populations. Bull trout populations appear somewhat stable around sometimes large annual spawning population fluctuations. Bull trout distribution though is reduced from historic, and some populations appear to have dangerously low numbers. Wild or native westslope cutthroat and redband (rainbow) trout appear to be numerous and well distributed; though there is some information that many of these populations may be hybridized with introduced fish. Better information on the distribution and status of fish communities may provide insight into this monitoring question.

Recent information suggests that the large stream systems on the Wenatchee NF may be recovering from degradation early in the Century (see *Ecological Health of River Basins in Forested Regions of Eastern Washington and Oregon*, Wissmar and others 1994, PNW-GTR-326). In some cases, such as portions of the Yakima, the improvement is relative as the streams were seriously impacted early in the century.

Stream habitat conditions often are below *Forest Plan* Standards, but whether the conditions are indicative of unhealthy watersheds or the Standards are not appropriate is not known, the question is being investigated. Fine sediment does

appear to be a problem in some streams, indicating delivery amounts and rates may be changed from historic; and, the conditions in some streams may harmful to native salmonids (and other aquatic species). Further monitoring is needed to determine if management, including restoration efforts, is meeting Aquatic Conservation Strategy objectives. An integrated analysis linking fish habitat surveys, hydrologic surveys and land systems inventory is moving toward a more complete understanding of what healthy streams should look like.

Recommendations Include:

Further Evaluation.

Continue monitoring and further refine the integrated analysis linking fish habitat surveys, hydrologic surveys and land systems inventory.

K. RANGE MANAGEMENT AND RELATED ACTIVITIES

Monitoring Item-

FORAGE UTILIZATION

The goal is to provide opportunities to maintain and/or enhance desired plant communities and other resource values while permitting livestock grazing. The monitoring question is:

Are the forage utilization levels consistent with goals for maintaining riparian and upland health?

In 1997, the results of three environmental assessments were implemented on three grazing allotments. This analysis was the first attempt to improve rangeland suitability with 1960 vintage surveys. Suitable rangeland declined on the average of approximately 55 percent. A number of resource conditions likely contributed to this decline: (1) reduction in timber harvest, (2) recovery of historic fires, (3) forest encroachment into meadows and rangelands, (4) increased crown closure of woodland rangelands, and (5) increased elk populations on the south half of the Wenatchee NF. Overstocking of forest stands directly affects understory forage production.

Grazing utilization monitoring was completed in 9 out of 22 active allotments. It was noted on the South end of the Wenatchee NF that elk use ranged from 10 to 20 percent prior to the domestic livestock turn-on date. In some cases, administrative actions have already been implemented, and in others continued monitoring will determine if grazing levels should be adjusted. Significant administrative actions taken include:

1. All annual grazing plans included *Forest Plan* Standards and were reviewed by the permittees prior to the grazing season.
2. Temporary closure of three allotments occurred for resource protection to allow recovery from natural and prescribed fires; these allotments were in their 3rd year of rest.
3. Actual use was reduced by at least 55 percent on three cattle allotments.
4. Four grazing permits were terminated.
5. Grazing was temporarily approved in Mills Canyon to rest the 1994 fire area.
6. Trespass was a recurring problem on one Ranger District; U.S. Attorney has taken a stand to increase penalties in the future.
7. On five sheep allotments it was noted that grazing areas were within Standards.
8. One permit waived to Forest Service will not be reallocated until allotment conditions improve.

Recommendations Include:

Continue monitoring as scheduled.

When necessary, take administrative action to insure that livestock grazing is in compliance with *Forest Plan* Standards and Guidelines.

L. ROAD MANAGEMENT

Monitoring Item-

ROAD CONSTRUCTION/RECONSTRUCTION

The goal is to ensure that the transportation system is being constructed/reconstructed to serve the planned resource management objectives at the assumed annual rates.

Roads are to be designed as safe and durable structures suitable for their intended uses. Within the Riparian-Aquatic Habitat Protection Zone, there are 11 Management Practices intended to minimize the amount of roads and their impacts. The Threshold of Variability for the road miles is 25 percent of the annual projections and 10 percent for the decade. Additional Standards and Guidelines are contained in the *Northwest Forest Plan*.

Unit of Measure	Forest Plan Decade Average	FY 97 Actual
Forest Road Program		
Construction Miles	2	0
Reconstruction Miles	16	0.3
Timber Purchaser		
Construction Miles	80	3.7
Reconstruction Miles	3	2.1

Approximately 0.3 miles of roads were reconstructed (and many spot repairs and improvements made) as part of the *Jobs in the Woods* program. This work was intended to correct or mitigate the negative effects of roads. There was no net increase of roads in key watersheds or any new roads in roadless areas. These were additional items required to be monitored by the *Northwest Forest Plan*.

Forest Road Program: The estimated average annual output for arterial and collector road construction and reconstruction is 18 miles per year. The actual accomplishment for Fiscal Year 1997 was 0.3 miles. This is outside of the 25 percent annual Threshold of Variability. The original estimates were based upon the historical amount of funds available for this purpose.

Timber Purchaser: The estimated average annual output for Timber Purchaser Road Construction is 83 miles. The actual accomplishment for Fiscal Year 1997 was 5.8 miles. This represents 7 percent of the projected output. The amount of road construction and reconstruction by Timber Purchasers is entirely dependent upon the amount and location of the timber contracted for harvesting. The assumption that this system will be completed in the first 18 years of the Plan is not valid.

Recommendations Include:

Continue monitoring as scheduled.

Monitoring indicates management direction is being achieved, continue current course.

Monitoring Item-

ROAD MAINTENANCE

The goal is to ensure that the transportation system is being maintained to the appropriate standard to serve the planned resource management objectives.

Unit of Measure	Forest Plan Decade Average	FY 97 Actual
Roads Maintained for:		
Passenger Cars Miles	1031	1110
High Clearance Vehicles Miles	3202	3160

The Wenatchee NF is beginning to experience the effects of the loss of maintenance performed by Timber Purchasers. In the past, the Purchasers have performed approximately 1 to 1.5 million dollars of maintenance annually; if appropriated (NRFD) road maintenance funds are not increased, there could be a significant reduction in the amount of roads available to the public and a reduction in the level of comfort and ease of access. This year, 65 percent of the roads were not maintained to Standard.

Recommendations Include:

Continue monitoring as scheduled.

Due to the uncertainty of future funding and harvest levels, it is premature to make assumptions about revised maintenance levels; however, it is logical to assume that should maintenance funds continue to decrease, more roads will be closed to public use.

Monitoring Item-

ROADS CLOSED/OBLITERATED

The goal is to determine how much of the transportation system is no longer needed for management activities. Short and long-term needs are to be considered. Roads can be closed and placed in Maintenance Level I or obliterated and removed from the transportation system inventory.

The *Forest Plan* Standard is that unless there is a resource need documented in the project analysis, currently open roads will remain open and newly constructed roads will be closed to public access by vehicle.

Unit of Measure	Forest Plan Decade Average	FY 97 Actual
Roads Closed Total System Miles	1703	976
Roads Obliterated Miles	NA	35

The Wenatchee NF is continuing a comprehensive process of access and travel management, and this year will continue a watershed analysis process that is likely to identify additional roads to be closed or obliterated.

Recommendations Include:

Further Evaluation; additional yearly information is needed. Due to the uncertainty about the future, it would be premature to make new assumptions for the purposes of estimating outputs.

M. INSECT AND DISEASE

Monitoring Item-

INSECT AND DISEASE CONTROL

The goal is to assure that management practices do not contribute to increases in the incidence of destructive insects and diseases, such as western spruce budworm, tussock moth, pine beetles, dwarf mistletoes, root rots, and others. The monitoring question is:

Are destructive insect and disease organisms remaining below potentially damaging levels following management activities?

A survey was conducted during the summer of 1997 by the Forest Insect and Disease (FID) staff of the Pacific Northwest Region, in cooperation with the Washington Department of Natural Resources. Copies of the survey maps were given to the Wenatchee NF and each RD. One publication produced and distributed in Fiscal Year 1997 was *Disturbance and Forest Health in Oregon and Washington*.

The survey was conducted from airplanes, and represents current insect conditions across the forested landscapes of the Wenatchee NF. The aerial survey, supplemented with other observations, indicates:

Defoliation by western spruce budworm and Douglas-fir tussock moth is at non-detectable levels. Same results reported in 1995 and 1996.

Mortality associated with mountain pine beetle appears to be slightly decreasing Forest-wide; one exception is the Entiat RD.

Western Pine Beetle activity has increased from last year. Chelan/Entiat,

Leavenworth, and Naches RDs are affected the most. Western pine beetle caused-mortality appears to be increasing in frequency in overstocked pole and small sawtimber size ponderosa pine stands. This insect will continue to pose a high risk for mortality due to overstocked stands in the dry forest of ponderosa pine, Douglas-fir, and grand fir.

Blister rust continues to kill Western White and Whitebark pines. It is most common on the Lake Wenatchee and Naches RDs.

Fir Engraver activity continues to show decline from the peak in the late 1980's.

Douglas-fir beetle activity is still low.

Englemann Spruce beetle activity is still low. The activity is confined to isolated small areas.

Balsam Woolly Adelgid activity is still low. Tree killing by this insect is mainly confined to Subalpine fir.

Western Balsam Bark Beetle activity is still low.

Insect populations and/or infection centers show an increase since the last measurement/survey. Forest-wide (all ownerships), the amount of insect and disease activity seems to be stable to slightly decreasing.

Recommendations Include:

Continue monitoring as scheduled.

N. FOREST FIRE PROTECTION

Monitoring Item -

FOREST FIRE PROTECTION

The goal is to provide protection from wildfires for Forest users, facilities and Wenatchee NF resources in an efficient manner. The monitoring questions are:

Are implemented fire suppression strategies adequately protecting the public, facilities and Forest resources?

Are costs of protection in line with those projected by the National Fire Management Analysis System?

The 1997 fire season was well below average in numbers of fires and number of acres burned, as well as in suppression dollars expended. The Wenatchee NF supported fire suppression efforts in other regions and forests, beginning in May and continuing into September. Fifty-seven personnel participated in 78 fire assignments. The Entiat Interagency Hotshot Crew had eight assignments and Wenatchee NF crews had three. Additionally, two groups of firefighters were sent to adjoining forests for prescribed burning and lightning fires. Off-Forest assignments were estimated at 1,200 person days.

The first statistical fire of the season occurred on April 28, 1997. Fire activity remained light until the lightning storm of August 6th which produced six fires on the north end of the Wenatchee NF. On August 14, the Gold Creek fire started; its final size was 435 acres. The area Incident Management Team was mobilized to support the suppression effort.

For the year, the Wenatchee NF had 61 fires, which is 50 percent of a 10-year average. Lightning accounted for 28 fires and the remaining 33 were human-caused. Total Wenatchee NF acres burned were 451 acres.

Emphasis was placed on developing and maintaining interagency programs to improve the efficiency of the Fire Management Program. The Wenatchee NF continued to participate in the Central Washington Interagency Communication Center (CWICC), to staff fire suppression engines, and to develop Incident Management Teams in partnership with the State of Washington Department of Natural Resources and other federal agencies.

The Wenatchee NF also hosted national fire suppression resources. These included an Interagency Hotshot Crew based at the Entiat RD and a light helicopter and crew with rappelling capability based at the Chelan RD. Two large air tankers and one lead plane were stationed at the Wenatchee Tanker Base. Also hosted on the Wenatchee NF was one regional fire suppression resource; a medium helicopter and crew were based at the Chelan RD.

In 1997, the Wenatchee NF emphasized safety both in training and daily work activities. Managers organized for this fire season by providing advanced training and encouraging employees to participate on Type I and Type II Incident Management Teams. All employees available for fire suppression received appropriate initial attack training. Many of these employees attended the Interagency Firefighter Training at Cispus Environmental Training Center.

In addition to the fire suppression program, we continued to emphasize fire detection and prevention as important components of the Fire Management Program. The number of fires caused by escaped campfires decreased from 40 in 1996 to 17 this year. Off Highway Vehicle rangers are effective in conveying fire prevention messages.

Recommendations Include:

Continue to monitor the effectiveness of the fire prevention program.

Monitoring Item -

USE OF PRESCRIBED FIRE

The goal is to provide appropriate, efficient application of prescribed fire in support of the Forest Management Program. The monitoring questions are:

Are the acres being treated with prescribed fire meeting expected resource management objectives?

Are Forest fuel loadings exceeding natural levels and therefore placing Forest users, improvements and/or resource values at risk?

The use of fire as a tool to manage unwanted vegetation and debris, to prepare areas for tree planting, and to improve wildlife habitat continued to be a significant portion of the fire program. During Fiscal Year 1997, 3,852 acres were treated with prescribed fire.

The Wenatchee NF successfully implemented prescribed burns that met resource management objectives and reduced fuel loadings. However, today's increased awareness about the dry forest ecosystem, which includes fuel loadings and stand densities in excess of historic conditions, has caused the Wenatchee NF to look for new management techniques which can be applied on a much larger scale than used in the past.

Recommendations Include:

Continue to support on-going research supporting fire as an important disturbance process in all dry site ecosystems.

The Wenatchee NF has developed a *Dry Site Strategy* which allows managers to implement fuel reduction and vegetation management activities on a large acreage scale that will decrease the possibility of high intensity fires.

O. AIR RESOURCE MANAGEMENT

Monitoring Item-

AIR RESOURCE MANAGEMENT

The goal is to maintain air quality in conjunction with all cooperating agencies. The monitoring questions are:

Are the impacts on air quality being considered in the management activities being proposed?

Is the Forest in compliance with direction outlined in the Clean Air Act, the Washington State Implementation Plan, and National Forest Policy?

The national visibility monitoring program entitled Interagency Monitoring of Protected Visual Environments (IMPROVE) began collecting data on visual air quality for selected Class I areas in 1988. Currently, 67 sites participate in the program across the Country. Program goals are to determine existing visual air quality, identify sources of visibility impairment, and document long-term trends so progress towards the Clean Air Act goal to remedy existing visibility impairment can be tracked.

The Wenatchee and Mt. Baker-Snoqualmie National Forests jointly sponsor an IMPROVE site to monitor visibility in Alpine Lakes Wilderness. The equipment has been located at Snoqualmie Pass and operated by staff from the Cle Elum RD since the Summer of 1993. Due to the complexity of the analysis, data results often lag more than a year behind data collection. Preliminary results from the site indicate some of the sources of visibility impairment. Important sources of visibility impairment include sulfates, nitrates, and organics. Sulfates are commonly associated with coal/oil fired power plants, and refining and smelting. Nitrates are generally associated with automobiles and other combustion sources. Organics can be natural emissions (biogenic), smoke, or industrial solvents. Less important to visibility impairment at Snoqualmie Pass are soot (diesel exhaust and smoke) and coarse particles (dust, smoke, and/or pollen).

The theoretical maximum distance one can see through a perfectly clean atmosphere is about 240 miles. Natural or historic annual average visibility at Snoqualmie Pass is estimated to have ranged from about 110-140 miles. The data summarize recent annual standard visual range in miles for the cleanest 20 percent of days, the dirtiest 20 percent of days, and the median of days. The values for the 3 years of available data are fairly consistent and no clear trend emerges. It does not appear that visibility is improving or getting worse from this data. Clearly there are many days every year when visibility is impaired in the Alpine Lakes Wilderness.

Recommendations Include:

Further Evaluation is needed.

P. MINERALS

Monitoring Item -

MINING SITE RECLAMATION

The goal is to ensure that disturbed lands are reclaimed to a use consistent with the Rehabilitation Standards and Guidelines.

The monitoring completed in 1997 indicates mining related activity may have increased slightly from what was reported in the previous years. In summary, it indicates that approximately 88 acres were disturbed by mining-related activities on the Wenatchee NF. Of this, about 35 acres (40 percent) were satisfactorily reclaimed and met reclamation objectives. The remaining 60 percent were not reclaimed due to continuing operations, or the operators have been told to bring the reclamation into compliance.

Number Plans of Operations, Notices of Intent, permits, etc: 174

Number and percent monitored: 66 (38%)

Number of acres disturbed: 88

Number of acres and percent reclaimed: 35 (40%)

Due to the lack of adequate funding, some of the reclamation efforts on the Wenatchee NF were not monitored. Of those that were monitored, about 95 percent had been appropriately reclaimed. The remaining 5 percent have not been reclaimed probably because the operation is continuing, or it has not been appropriately monitored due to lack of funding. Adequate reclamation will be conducted, or reclamation bonds used, to bring the reclamation up to Standard. It is assumed that similar results would be found on those operations that were not monitored.

Until the budget and organization are at an adequate funding level the monitoring evaluation will not be conclusive. The objectives in the *Forest Plan* appear to be adequate, and performance bonds and regulatory authority provide for compliance when that is not being achieved.

Recommendations Include:

The major problem with appropriate monitoring is not the process, but the available funding and staff. Request funding that will allow 100 percent monitoring of all mineral related activities.

If funding is provided then conduct additional monitoring to ensure adequate reclamation is being completed; where it is not being properly completed, take regulatory action to require the operator to do the required reclamation, or use the bonds to do the work ourselves.

Complete the inventory and evaluation of abandoned mine sites, and request funding to do the necessary clean-up and reclamation work.

Monitoring Item -**MINING OPERATING PLANS**

The goal is to ensure that mining plans of operations and notices of intent to operate are processed in a timely manner and administered, complying with Regulations and with Forest Management Goals and Management Area Standards and Guidelines.

Approximately 113 Plans of Operations and Notices of Intent were processed in Fiscal Year 1997. Of these, only 56 percent of the total operations were monitored. Based upon the monitoring that was done, it is estimated that approximately 88 acres were disturbed, with 35 percent being adequately reclaimed. Ninety-five percent of activities monitored were adequately meeting the objectives of the *Forest Plan*.

Number of Plans of Operations and Notices of Intent: 113

Number and percent monitored: 63 (56%)

Number and percent in compliance: 60 (95%)

Due to the lack adequate level funding, lack of available personnel and other priorities, monitoring could not be done on all operations. As a consequence, the actual percentage of operations meeting our objectives is not known. This will continue until funding is increased. It is assumed that monitoring is being done on the larger, more environmentally sensitive operations; and similar results would be found on those operations that were not monitored.

Recommendations Include:

The objectives and Standards and Guidelines in the Plan appear adequate, but the level of funding is inadequate to ensure total compliance. Request adequate funding that will allow monitoring of all mineral related activities.

Based upon the monitoring completed, a *Forest Plan* adjustment is not necessary at this time; an adjustment for mining in Riparian areas is being considered, however, it may be completed with the *Forest Plan* revision.

Actively conduct programmatic resource surveys that will accommodate anticipated mineral activity and other similar resource activities. This will allow the processing of Plans of Operation in a more timely and efficient manner.

Q. COMMUNITY EFFECTS AND RESOURCE BUDGETS

Monitoring Item -

Community Effects

The goal is to provide local communities with a constant source of opportunity for the use of goods and services that provide for desired community growth. The Wenatchee NF Impact Area includes Chelan, Douglas, Kittitas, and Yakima Counties. The monitoring questions are:

Are payments to counties changing?

Are local populations changing?

Are local employment patterns changing?

Are lifestyles, attitudes, beliefs, or values changing?

Are Forest contributions to area forest products industries changing?

Changes in Payments to Counties

By law, 25 percent of the revenues collected by the Forest Service from the use of National Forest lands and resources are returned to the counties as a source of funds for schools and roads. In Washington State, half of the funds (school portion) are redistributed throughout the State, while the road portion remains within the county.

Historically, the majority of the receipts have been generated by timber sales. Because of the sharp reduction in timber sales on public lands, the receipts have declined dramatically; however, timber sales still provide the majority of receipts. Recreation fees for campgrounds have declined over the past 5 years as more Forest Service campgrounds have been converted to concessionaire operations.

In 1993, Congress passed Section 315 of the Interior and Related Agencies 1993 Appropriations Act which was designed to mitigate the economic effects associated with the listing of the northern spotted owl. For Fiscal Year 1996 the Forest Service paid the states and counties affected by the listing of northern spotted owl at a rate equal to 79 percent of the 5 year (1986-1990) average. This owl guarantee payment will continue to decline 3 percent each year into the next decade.

Area	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996
Chelan Co.	2,144,756.14	2,061,905.09	1,948,905.09	1,948,376.20	1,884,349.37	1,748,869.71
Douglas Co.	2.99	2.86	2.70	2.70	2.61	2.41
Kittitas Co.	885,707.05	790,851.86	731,547.75	731,499.24	707,795.97	655,894.35
Yakima Co.	3,351,123.98	2,674,761.01	2,406,458.57	2,405,790.68	2,317,723.14	2,167,207.73
Total	6,392,590.16	5,527,520.62	5,086,335.28	5,085,688.82	4,909,871.09	4,571,974.2

Without the owl guarantee payment the payments to counties would have been as follows:

- (1) Chelan County, \$445,472.76, (2) Douglas County, \$.61,
- (3) Kittitas County, \$134,773.03, and (4) Yakima County, \$243,732.62.

The 1990 *Forest Plan* predicted county revenues of \$5,085,300 per year. The payments to the counties are well within this threshold. The *Northwest Forest Plan* predicted county revenues of approximately \$1,800,000 for the Wenatchee Impact Area Counties. The actual receipts were \$823,979.02. Legislation passed by Congress has resulted in a much higher payment to the impacted counties.

Change in Local Population

The population continues to increase within the Counties influenced by the Wenatchee NF. According to the State of Washington Office of Financial Management, growth rates in eastern Washington have dropped below rates in western Washington; however, the growth rate for Chelan, Douglas, Kittitas, and Yakima Counties continues to be above the State average and rates for western Washington. For Chelan, Douglas, and Kittitas Counties, the population increase is due to migration primarily from the Puget Sound. Yakima County's growth is due to births rather than in-migration. Kittitas County growth appears to be driven by people who still work in the Puget Sound, but have changed their primary residence to Kittitas County.

Economic conditions improved in western Washington during 1997, which should lead to lower migration rates to the eastern slope counties. For 1996, population growth continued though below rates for Washington State. Kittitas County, which is most directly tied to the Puget Sound economy, had population growth rates exceeding State averages.

Percent Annual Population Growth Rates

Area	1991	1992	1993	1994	1995	1996	1997
Chelan Co.	1.82%	2.63%	2.56%	3.57%	3.45%	2.17%	1.47%
Douglas Co.	4.94%	1.45%	2.15%	2.81%	1.02%	2.70%	1.32%
Kittitas Co.	2.53%	1.46%	5.04%	1.71%	1.35%	2.33%	2.27%
Yakima Co.	0.89%	1.78%	1.60%	2.59%	0.99%	1.71%	0.53%
Impact Area	1.55%	1.86%	2.12%	2.69%	1.46%	1.95%	0.94%
WA State	2.75%	2.33%	2.43%	1.78%	1.79%	1.60%	1.63%
King County	2.32%	1.44%	1.48%	0.74%	0.88%	.94%	1.07%

Estimated Total Population 1991-1997

Area	1991	1992	1993	1994	1995	1996	1997
Chelan Co.	53,200	54,600	56,000	58,000	60,000	61,300	62,200
Douglas Co.	27,500	27,900	28,500	29,300	29,600	30,400	30,800
Kittitas Co.	27,400	27,800	29,200	29,700	30,100	30,800	31,500
Yakima Co.	190,500	193,900	197,000	202,100	204,100	207,600	208,700
Impact Area	300,591	306,192	312,693	321,094	325,795	330,100	333,200
WA State	5,000,371	5,116,671	5,240,900	5,334,400	5,429,900	5,516,800	5,606,800
King Co.	1,542,286	1,564,486	1,587,700	1,599,500	1,613,600	1,628,800	1,646,200

Changes in Local Employment Patterns

The State of Washington Employment Security Reports for Employment and Wages are published on a one-year delay. The employment data for 1996 are the most recent available.

In 1996, the economy in the Wenatchee Impact Area grew 1.09 percent. This compares with a growth rate of 2.77 percent for Washington State. This is a significant change from 1990 through 1994, when the local economy grew significantly faster than the State economy.

Total Covered Employment

Area	1990	1991	1992	1993	1994	1995	%Change 95-96	%Change 90-96
Chelan County	29,757	30,296	30,655	32,166	34,479	33,777	0.33%	13.9%
Douglas County	8,334	8,303	8,091	7,950	8,379	8,538	1.90%	1.0%
Kittitas County	9,147	9,249	9,538	10,270	10,772	11,616	1.37%	24.0%
Yakima County	82,706	81,466	85,919	87,867	90,022	89,354	1.26%	9.4%
Impact Area	129,944	129,314	134,203	138,253	143,652	143,285	1.09%	10.9%
WA State	2,144,370	2,160,883	2,205,665	2,248,245	2,303,539	2,339,727	2.77%	12.1%

Percent Change in Covered Employment by Sector from 1990 to 1996

Sector	Wenatchee Impact Area		State of Washington	
	1990-1996	1995-1996	1990-1996	1994-1996
Agriculture, Forestry, & Fish	-2.34%	1.50%	6.95%	3.21%
Mining and Construction	25.30%	1.90%	5.46%	3.70%
Manufacturing	5.20%	3.61%	-7.41%	3.45%
Transportation & Public Utilities	4.91%	3.24%	11.40%	3.84%
Wholesale Trade	8.61%	-7.60%	11.97%	0.83%
Retail Trade	13.77%	0.72%	13.02%	1.55%
Finance, Insurance, & Real Estate	8.09%	-4.96%	6.06%	1.52%
Services	23.73%	2.97%	29.54%	4.71%
Government	18.42%	1.06%	13.74%	1.18%
Total	10.92%	1.09%	12.14%	2.77%

The major economic sectors in the area are agriculture, retail trade, services, and government. Agriculture is the largest sector, but indicative of change it decreased in employment by 2.34 percent from 1990 through 1996. In 1996, agricultural employment increased by 1.5 percent, but this is well below the State average of 3.21 percent. Almost all major sectors grew more slowly or declined more rapidly in 1996, compared to the State. Wholesale trade and the Finance, Insurance, and Real Estate sectors showed the greatest declines. For the period 1990-1996, the slow employment growth in the past several years has resulted in employment growth now being below the State average.

**Average Annual Wages Paid per Job by Covered Employment by Year
(1995 base year)**

Area	1990	1991	1992	1993	1994	1995	1996
Chelan Co.	18,552	19,683	19,448	19,403	19,413	19,885	21,071
Douglas Co.	14,618	15,293	15,808	15,944	15,880	16,329	17,553
Kittitas Co.	18,416	18,365	18,517	18,322	18,183	17,440	18,847
Yakima Co.	17,603	17,987	17,948	18,485	18,851	19,195	19,778
Impact Area	17,686	18,238	18,411	18,540	18,763	19,044	19,879
WA State				26,744	26,860	27,446	28,883

Average real wages continued to increase in the area. Real wages in Kittitas County have finally exceeded those paid in 1990. Growth in real wages for the Wenatchee Impact Area continue to trail State averages.

The Lumber and Wood Products Manufacturing, Paper and Allied Products, Manufacturing, Eating and Drinking Establishments in the Retail Trade Sector, and Hotel and Other Lodging Places in the Service Sector are industries directly affected by Wenatchee NF activities. The growth and changes in the economy in this area have made these sectors less dependent on the Wenatchee NF.

The substantial reduction in timber harvest levels on federal lands has been mitigated to a certain extent by increased timber harvest from small landowners. This was in response to high prices brought on by lumber shortages in the early 1990's. The following tables show employment and wages for those economic sectors directly affected by Wenatchee NF activities.

Covered Employment: Manufacturing - Lumber and Wood Products

Area	1990	1991	1992	1993	1994	1995	1996	% Change 90-96
Chelan Co.	236	172	208	202	208	203	228	-3.4%
Douglas Co.	0	0	0	0	0	0	0	n/a
Kittitas Co.	170	169	156	161	145	146	126	-25.9%
Yakima Co.	1,490	1,593	1,677	1,726	1,884	1,704	1,682	12.9%
Impact Area	1,896	1,934	2,041	2,089	2,237	2,053	2,036	7.4%

Covered Employment: Manufacturing - Paper and Allied Products

Area	1990	1991	1992	1993	1994	1995	1996	% Change 90-96
Chelan Co.	0	0	0	0	0	0	0	n/a
Douglas Co.	0	0	0	0	0	0	0	n/a
Kittitas Co.	0	0	0	0	0	0	0	n/a
Yakima Co.	862	692	707	684	677	708	756	-12.3%
Impact Area	862	692	707	684	677	708	756	-12.3%

COMMUNITY EFFECTS AND RESOURCE BUDGETS**Covered Employment: Retail Trade - Eating and Drinking Places**

Area	1990	1991	1992	1993	1994	1995	1996	% Change 90-96
Chelan Co.	1,786	1,858	2,098	2,163	2,212	2,187	2,103	17.7%
Douglas Co.	490	464	478	508	551	559	558	13.9%
Kittitas Co.	1,104	1,122	1,189	1,250	1,447	1,394	1,332	20.7%
Yakima Co.	4,039	4,018	4,309	4,374	4,405	4,427	4,663	15.4%
Impact Area	7,419	7,462	8,074	8,295	8,615	8,567	8,656	16.7%

Covered Employment: Services - Hotels and Lodging Places

Area	1990	1991	1992	1993	1994	1995	1996	% Change 90-96
Chelan Co.	872	881	852	868	857	889	860	-1.4%
Douglas Co.	0	0	0	0	0	126	128	n/a
Kittitas Co.	1,410	1,736	1,750	1,891	1,901	1,891	1,981	40.5%
Yakima Co.	846	671	635	584	614	661	638	-24.6%
Impact Area	1,936	1,808	1,723	1,698	1,688	1,764	1,712	-11.6%

Covered Employment: Services - Amusement and Recreation Services

Area	1990	1991	1992	1993	1994	1995	1996	% Change 90-96
Chelan Co.	452	504	328	364	397	400	454	0.4%
Douglas Co.	80	65	81	105	116	125	121	51.3%
Kittitas Co.	516	372	362	260	351	590	516	0.0%
Yakima Co.	836	829	815	942	1,016	977	1,112	33.0%
Impact Area	1,884	1,770	1,586	1,671	1,880	2,092	2,203	16.9%

Average Real Wages: Manufacturing - Lumber and Wood Products

Area	1990	1991	1992	1993	1994	1995	1996	% Change 90-96
Chelan Co.	22,752	20,355	20,987	23,041	23,103	24,390	24,504	11.3%
Douglas Co.	0	0	0	0	0	0	0	0.0%
Kittitas Co.	26,345	25,374	26,106	23,351	21,683	23,118	25,421	-3.5%
Yakima Co.	26,798	26,008	26,397	25,252	25,636	26,642	27,675	3.3%
Impact Area	26,254	25,450	25,450	24,892	24,145	26,168	27,180	3.5%

Average Real Wages: Manufacturing - Paper and Allied Products

Area	1990	1991	1992	1993	1994	1995	1996	% Change 90-96
Chelan Co.	0	0	0	0	0	0	0	0.0%
Douglas Co.	0	0	0	0	0	0	0	0.0%
Kittitas Co.	0	0	0	0	0	0	0	0.0%
Yakima Co.	34,895	31,707	31,924	31,559	33,265	34,207	34,624	-3.6%
Impact Area	34,895	31,707	31,924	31,559	33,265	34,207	34,624	-3.6%

Average Real Wages: Retail Trade - Eating and Drinking Places

Area	1990	1991	1992	1993	1994	1995	1996	% Change 90-96
Chelan Co.	7,865	7,885	8,163	8,302	8,659	8,992	9,287	18.1%
Douglas Co.	6,920	6,861	7,620	7,857	7,835	8,096	8,364	20.9%
Kittitas Co.	8,254	8,049	8,144	8,050	8,064	8,102	8,246	-0.1%
Yakima Co.	7,626	8,005	8,070	8,549	8,427	8,616	8,515	11.7%
Impact Area	7,730	7,910	8,078	8,367	8,887	8,594	8,652	11.9%

Average Real Wages: Services - Hotels and Lodging Places

Area	1990	1991	1992	1993	1994	1995	1996	% Change 90-96
Chelan Co.	9,459	9,814	9,569	9,843	9,978	9,925	10,228	8.1%
Douglas Co.	0	0	0	0	0	0	0	0
Kittitas Co.	7,542	7,561	8,038	8,141	9,102	9,013	9,257	22.7%
Yakima Co.	9,583	10,050	9,179	9,770	10,314	10,047	10,644	11.1%
Impact Area	9,297	9,582	9,216	9,572	9,987	9,860	10,262	10.4%

Average Real Wages: Services - Amusement and Recreation Services

Area	1990	1991	1992	1993	1994	1995	1996	% Change 90-96
Chelan Co.	9,919	10,112	9,250	9,368	9,636	10,409	10,443	5.3%
Douglas Co.	11,310	11,424	12,071	13,535	13,408	13,072	13,331	17.9%
Kittitas Co.	5,841	6,306	5,959	4,281	6,231	6,737	6,322	8.2%
Yakima Co.	9,122	10,078	11,561	10,519	10,972	11,691	9,575	5.0%
Impact Area	8,507	9,345	9,830	9,487	9,955	10,131	9,198	8.1%

Change in Lifestyles, Attitudes, Beliefs, or Values

The first decade of the 1990's was characterized by heavy urban migration to rural areas. This migration was particularly heavy in those areas with outdoor recreation opportunities. In Kittitas County, there has been an influx of residents that have continued to work in the Puget Sound. It is highly likely that within the next 10 to 20 years, Kittitas County will become a bedroom community of the Seattle area.

The slow economic growth in the urban areas during the early 1990's resulted in downsizing, early retirements, and layoffs. This has fueled population growth and economic growth in areas like eastern Washington. This process has been reversing in the past 3 years. Economic growth has been higher in Puget Sound than eastern Washington. This could lead to migration back to urban areas as people seek employment opportunities.

A study by Montana State University showed that only 10 percent of urban transplants remained in Montana after 10 years. Lack of employment opportunities and problems adapting to rural lifestyles lead to most of these individuals moving back to the cities. There is some evidence of this in Chelan and Douglas Counties, which were popular areas for urban transplants. This movement could be offset by an increase in retirees coming to the area. The increased population and declining employment data suggest that this could be a possibility.

The area is changing, becoming more urban in lifestyles, attitudes, beliefs, and values. These changes are driven by national trends and are outside the scope of the Forest Service Programs.

Changes in Forest Contribution to Forest Products Industry

The following table shows the volume harvested on Wenatchee NF managed lands and the volume offered for sale.

Fiscal Year	Volume Offered	Volume Harvested
1990	227	173
1991	15.4	136
1992	22.9	94
1993	16.8	58.4
1994	12.0	32.5
1995	98.8	19.9
1996	92.5	91.7
1997	50.4	56.4

The volume sold in 1990 reflects the requirements of Section 318 of the Federal Budget Act. The significant drop in volume sold in 1991 is the result of court and agency decisions on the management of the northern spotted owl habitat. Volume offered continued to drop through 1994 in response to court and agency decisions on the management of northern spotted owl habitat and the development and adoption of the *Northwest Forest Plan*. The volume offered in Fiscal Year 1995 and Fiscal Year 1996 reflects the salvage volume after the wildfires of 1994.

Monitoring Item -

Resource Budgets

The goal is to provide funding levels necessary to achieve outputs in the *Forest Plan*. The monitoring question is:

Are the budgets received adequate for achieving the objectives described and projected in the Forest Plan?

The following table reflects the program budgets on the Wenatchee NF since 1991. The definitions of program areas change from Fiscal Year 1991 to Fiscal Year 1996, and this reflects some of the changes in funding for individual program areas.

Program Area	Fiscal Year 1991	Fiscal Year 1992	Fiscal Year 1993	Fiscal Year 1994	Fiscal Year 1995	Fiscal Year 1996	Fiscal Year 1997
Recreation	3,027,000	3,739,000	4,535,035	3,428,690	2,577,795	2,250,240	2,084,844
Fisheries	520,000	956,000	1,381,889	761,487	485,205	500,151	550,252
Threatened & Endangered Species	244,000	255,000	175,908	317,008	170,437	174,726	172,957
Wildlife	244,000	279,000	156,329	206,614	436,327	486,087	400,775
Range	198,000	149,000	276,630	254,533	324,608	212,983	226,124
Timber	7,944,000	7,096,000	5,423,457	5,420,986	8,612,462	7,817,329	10,569,634
Other Resource Support to Timber	973,000	1,326,000	1,077,171	709,364			
Watershed & Air	1,772,000	1,075,000	885,223	2,938,457	581,286	601,236	597,545
Minerals & Geology	188,000	161,000	240,104	203,359	327,398	290,070	269,746
Lands	1,257,000	4,347,000	4,328,440	901,096	4,006,100	366,543	1,867,012
Facilities & Transportation	5,005,000	6,200,000	3,999,503	3,854,485	3,192,169	2,683,177	8,316,813
Protection, State & Private Forestry	3,357,000	5,692,000	3,339,958	11,774,526*	11,762,625*	4,360,732	4,891,244
General Administration	2,691,000	4,372,000	2,419,543	2,332,846	2,449,668	2,125,070	1,630,304
Overhead Assessments	3,111,000	3,321,000	2,764,588	2,991,427	3,264,416	3,160,177	2,965,493
TOTAL EXPENDITURES	30,531,000	38,968,000	31,063,778	36,094,878	39,809,950	26,117,162	34,542,743

FY 1994 figure includes \$7.8 million for emergency fire recovery. FY 1995 figure includes \$7.7 million for emergency fire recovery.

COMMUNITY EFFECTS AND RESOURCE BUDGETS

The budgets reflect emergency federal action and shifts in Congressional funding. For example, the large expenditure in Watershed and Air in 1990 reflects the cleanup and rehabilitation after the floods of 1990. The Fiscal Year 1994 and Fiscal Year 1995 budgets reflect emergency fire recovery funds as a result of the 1994 fires.

Recommendations Include:

Continue monitoring as scheduled.

R. GENERAL MONITORING OF STANDARDS & GUIDELINES

Monitoring Item-

STANDARD AND GUIDELINES GENERAL

The goal is to ensure implementation and validation of *Forest Plan* Standards and Guidelines. Monitoring seeks to assure Wenatchee NF goals, outputs, and the desired future condition. The monitoring questions are:

Are Forest Plan Standards and Guidelines being implemented?

Are implemented Standards and Guidelines achieving the expected results?

Proposed projects are reviewed for consistency with *Forest Plan* Standards and Guidelines during the National Environmental Policy Act process. After the signing of the *Northwest Forest Plan*, training sessions were held in Yakima and Leavenworth to ensure that Wenatchee NF employees understood the rationale and Standards and Guidelines within the Plan. These training sessions and reviews are done on a continuing basis.

The *Northwest Forest Plan* established an interagency monitoring program on implementation monitoring. The procedures were developed in Fiscal Year 1995 and a test implementation was conducted in Fiscal Year 1996. A sample of projects were monitored. The interagency team found that the projects were consistent with the Standards and Guidelines in the *Northwest Forest Plan*.

This interagency implementation monitoring effort was expanded in 1997 to include three projects on the Wenatchee NF: The Mad Billy Timber Sale on the Entiat RD; the Ty-Chi Timber Sale on the Lake Wenatchee RD; and, the Nason Creek Road Decommissioning/ Reconstruction watershed restoration project on the Lake Wenatchee RD.

The Review Team consisted of representatives of the USDI Fish and Wildlife Service, USDI Bureau of Indian Affairs, USDI National Park Service, Environmental Protection Agency, USDI Bureau of Land Management, Yakama Indian Nation, and the USDA Forest Service.

The team completed a detailed monitoring report on each project and concluded that all three projects met the intent of the *Northwest Forest Plan*.

Recommendations Include:

Continue monitoring as scheduled.

FOREST PLANNING UPDATE

FOREST PLAN AMENDMENTS

There was one amendment to the *Wenatchee Forest Plan* in Fiscal Year 1997. This amendment assigned land allocations to certain parcels of land in Townships 26-27N, and Ranges 18-19E, acquired since the original 1990 *Forest Plan* was issued. Environmental analysis for the Snoqualmie Pass Adaptive Management Area (AMA) Plan was also completed in Fiscal Year 1997. This document was developed under the direction of the *Northwest Forest Plan* to provide a comprehensive management plan for the AMA.

SUMMARY OF CURRENT RESEARCH EFFORTS

The following projects were accomplished in a cooperative effort between the Wenatchee and Okanogan National Forests and the Wenatchee Forestry Sciences Lab.

Projects on Which Scientific Papers were Published in 1997

Structure of northern spotted owl nest stands and their historical conditions on the eastern slope of the Pacific Northwest Cascades. (Journal of Ecology and Management).

Summary- The northern spotted owl is not using just one type of nest stand, but uses a wide array of nesting habitat (9 different structural stand types). Stand structure, species composition and density have changed dramatically the last 100 years, mainly due to fire suppression. Only 12 percent of the nest stands are classified as "old growth" forest. These overstocked stands are at high risk to fire. These different stand types should give land managers more flexibility and opportunity in managing for both spotted owl habitat and a sustainable forest.

Snag dynamics in a chronosequence of 26 wildfire burns on the east slope of the Washington Cascades (Journal of Int. Wildlife Fire) (submitted)

Summary- Snag density is not uniform across the landscape. Snag longevity was greatest for thick bark (Douglas-fir/ponderosa pine) species >16" dbh, and Douglas-fir snags stand long enough (80 years) to avoid a snag recruitment gap. Thick bark species reach soft snag conditions (decay class 3) sooner than thin bark species. The tops of thick bark species break off (50 percent of height in 15 years) while thin bark species fall tree length. By 10 years, 50 percent of snags <9" dbh are on the ground. If snag populations are to be maintained over long periods of time following stand replacement disturbance, the task will fall to snags >16" dbh for Douglas-fir, ponderosa pine and Engleman Spruce.

Change in Historical Forest Meadow Edge and Area (Journal of Arctic and Alpine Research) (submitted)

Summary- Forest meadows are unique habitats that can be lost or reduced in area through tree encroachment. The decline in meadow area and perimeter could affect site and landscape diversity for open and edge dependent species. The mean decline in meadow area the last 50 years is 30 percent and meadow perimeter is 26 percent due to reduced fire effects and grazing.

Current Ongoing Research Efforts***Fire history in the ponderosa pine/Douglas-fir forests on the east slope of the Washington Cascades.***

This paper is the result of data collected on the Tyee Fire (Mud Creek) and the Nile Creek area on the Naches RD, and is 95 percent complete.

Summary- Historically, fires in these habitats were large, frequent (7 years) and of low intensity. There is no evidence for landscape level stand replacement fires. Today, fires in these habitat types are large, intense stand replacement events. Gaps in fire free interval >17 years were enough time for Douglas-fir to become established on north slopes and act as fuel ladders. This created small stand replacement fires in a mosaic pattern. There was no significant difference in fire free interval between north and south slope land types. Fire suppression has altered these forest structures so they are now two to seven times more dense than they were historically. This suggests the need for large scale thinning with more intense small patch treatments to restore ecosystem integrity and a forest structure sustainable under historic disturbance regimes.

Fire hazards of spotted owl neighborhoods on the east slope of the Washington Cascades.

This paper is 95 percent complete and describes the potential for crown fire risks in a variety of habitat types.

Summary- Most of these areas had a fire free interval of 16 years prior to 1990. The lack of fire in these areas has changed the characteristics of many forest stands. Stand density had increased, species composition has been altered from seral to more shade tolerant, and fuels have accumulated, particularly ladder fuels. The net effect of these changes has been a shift away from frequent low intensity regimes to a higher risk of stand replacement fires.

Decadal changes in stand structure of spotted owl nest stands on the east slope of the Pacific Northwest Cascades.

This paper will describe the changes in stand structure and species composition by decade since 1990.

Fire history in riparian and adjacent upslope areas in the ponderosa pine/Douglas-fir habitats on the east slope of the Cascades.

This paper will define fire regime differences between upslope and riparian areas: testing criteria for riparian buffer strip establishment and width.

Establishment of riparian buffer strips constitutes administrative fragmentation of the forest. Their establishment is justified to protect already severely impacted aquatic-riparian systems, but may be counter-productive in healthy aquatic-riparian-forest system. In systems where riparian and upslope disturbance regimes are different, buffer strips would appear appropriate and width should reflect the boundary between disturbance regimes. Where riparian and upslope disturbance regimes are the same, a buffer strip appears less feasible and inconsistent with ecosystem management. Adjacent ecosystem components that share common disturbance regimes should not be isolated from each other. We need to know when riparian buffer strips are valid and when they are not.

List of Preparers

Jim Furlong	Planning Team Leader General Monitoring of Standards and Guidelines
Ruth Anne Miller	Writer/Editor
Dan O'Connor	Visual Information Specialist
Vladimir Steblina	Forest Recreation & Wilderness Program Manager Forest Economist Recreation, Trails, and Wilderness Community Effects
Henry Maekawa	Forest Landscape Architect Scenery Management
Barbara Jackson	Landscape Architect Scenery Management
Powys Gadd	Forest Archeologist Cultural Resources
Terry Lillybridge	Forest Botanist/Ecologist Sensitive Plants, Biodiversity, and Old Growth
Charles Phillips	Forest Wildlife Biologist Wildlife
Bill Armes	Silviculturist Timber Offered, Harvested, and Related Silvicultural Activities Insect and Disease
Carl Davis	Forest Soil Scientist/Range Program Manager Soils, Range Management and Related Activities
Ken MacDonald	Forest Fisheries Biologist Soil, Water, Fisheries, and Related Watershed Management
Pierre Dawson	Fisheries Biologist Soil, Water, Fisheries, and Related Watershed Management
Wayne Christensen	Forest Engineer Road Management
Shari Miller	Fire Planning Specialist Forest Fire Protection
Janice Peterson	Zone Air Resource Specialist Air Resource Management
Tom Robison	Forest Hydrologist/ Water & Air Program Manager Soil, Water, Fisheries, and Related Watershed Management
John Simmons	Are Mineral Examiner Minerals
Susan Carter	Forest NEPA, Appeals, Litigation Coordinator Forest Plan Appeals and Litigation

U.S. DEPARTMENT OF AGRICULTURE

FOREST SERVICE

Wenatchee National Forest

215 Melody Lane

Wenatchee, WA 98801

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